

THE IRON AGE.

THURSDAY, JANUARY 18, 1900.

The First Coaling Station for the United States Navy.

Navy Yard, New London, Conn.

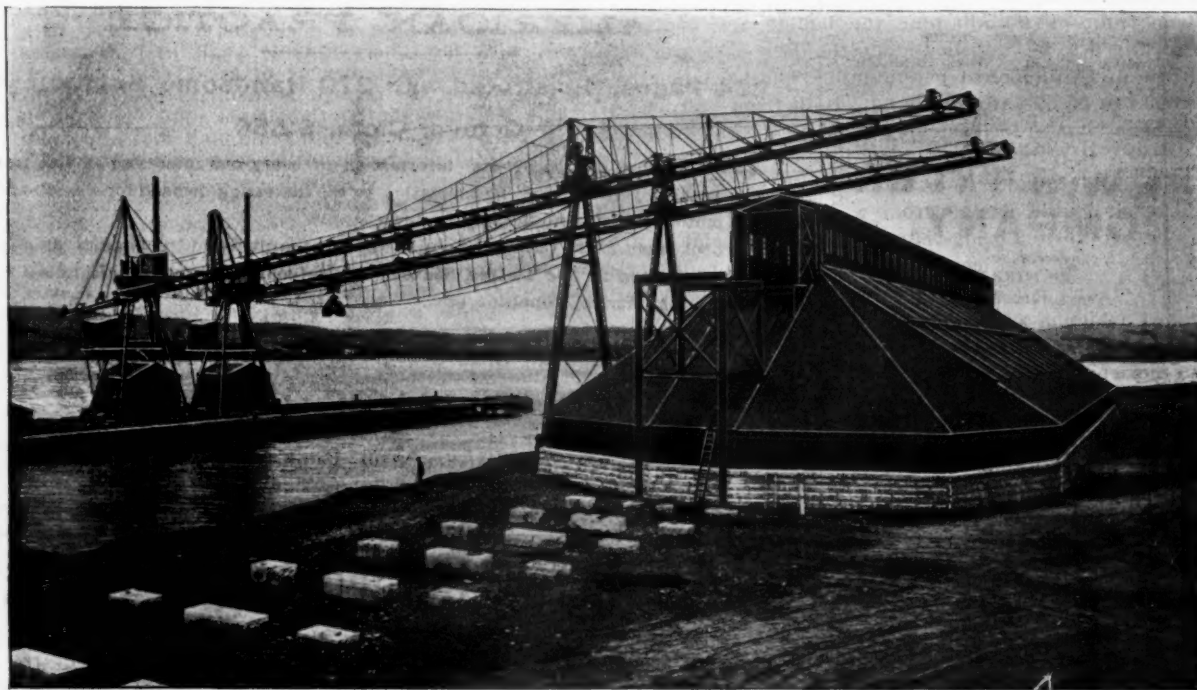
For several years the Navy Department has been giving careful consideration to the establishment of permanent coaling stations at the most important strategic points, appreciating the necessity of having an accumulation of coal on hand for emergency; of protecting the fuel from deterioration resulting from exposure to weather, and constructing mechanical devices to handle coal from store to vessel with the greatest rapidity.

The accompanying engraving represents the first completed plant of this kind, just finished at the Naval Station, New London, Conn., by J. W. Hoffman & Co., engineers and contractors, of Philadelphia, now suc-

cessful in securing contracts for the construction of similar plants at other points. This is also prevented in case of the central columns by jacketing them with sheet iron and filling the space with carefully rammed concrete; so that in no case does the coal come in contact with the metal.

The lantern top to the roof protects the standard gauge railroad tracks, running the entire length of the building, and also contains the mechanism for opening and closing the hatches, as well as lighting and ventilating the building. As shown, there are 14 hatches on each side of the building, each having independent opening mechanism, giving a continuous line of openings available. The covering of the building is corrugated metal, and no wood is used in the construction.

A concrete sea wall extends the entire length of the building, carrying a single line of rail on which the in-shore legs of the conveyors travel. To carry the con-



THE FIRST COALING STATION FOR THE UNITED STATES NAVY.

ceeded in this branch of business by the Hoffman Engineering & Contracting Company. The building has a storage capacity of 10,000 tons, its general dimensions being:

Building—		Conveyor—	
Length	290 feet.	Outboard end.....	35 feet.
Width	97 feet.	Clear span.....	198 feet.
Capacity.....	10,000 tons.	Inboard end.....	69 feet.
Height of coal.....	35 feet.	Capacity.....	100 tons per hour.

As it was necessarily located near the water's edge and on unreliable ground, the foundations necessary to carry the load required careful consideration. After excavation to low tide level the entire area was piled, some 1260 piles being required. These piles were then capped with 12 x 12 timber, with a superimposed close grillage of 12 x 12 timber: above this grillage were gravel and sand filling, well puddled, and a concrete floor, granolithic finish, 12 inches thick. Under the walls and under the center lines of columns supporting the roof and the railroad tracks running through the building the piles were more closely spaced. The walls are granite, range ashlar, and 5 feet 6 inches above the floor. The pitch of the roof is sufficient to prevent the coal from coming into

contact with the metal. This is also prevented in case of the central columns by jacketing them with sheet iron and filling the space with carefully rammed concrete; so that in no case does the coal come in contact with the metal.

The Conveying and Handling Plant.

The coal conveying and handling plant consists of two of Brown's bridge tramways, which, in conjunction with the steel shed as shown, will enable boats of various sizes and with different numbers of hatches to be unloaded economically and quickly, and the coal transported to and deposited into any portion of the coal storage shed. The coal can also be dumped anywhere between the pier and the shed if desired, and transferred direct from small lighters (which can float in the water space behind the pier) to vessels in front of the pier. The coal can also be rehandled through any hatch of the shed to any hatch in vessels or lighters either in front or behind the pier. Coal can also be rehandled from the storage shed by the automatic grab buckets furnished, or it can be shoveled by hand into the dumping buckets.

Bags may also be filled in the building and trans-

ported on crates mounted on wheels, and these crates can in turn be lifted through the hatches of the building and conveyed to and lowered through the hatches of the vessels. The arrangement shown makes it also possible to load or unload any other kind of material anywhere within range of the machines and within their capacity, and this material can be conveyed and deposited to any position within their range, or can be transferred to wagons or cars, or to lighters beyond the pier, or between the piers and the shore. In other words, the hoisting and conveying machinery is not only a complete coal handling apparatus in itself, but it also constitutes as well a perfect traveling crane for handling any material along its entire length, as well as over the entire length of wharf over which it travels.

The front piers of these conveyors contain machinery, engine and boiler housed, movable with them, and travel on rails, as indicated in the photograph near the front of the wharf, and the rear piers supporting the opposite end of the bridges travel on a rail on the foundation wall at the side of the coal shed. The whole structure, together with the engine and operator's houses, is entirely of iron and steel. All the motions of hoisting and conveying may be performed in either direction at will of the operator. The engine power of each tramway is guaranteed to hoist 3000 pounds at the rate of 350 feet per minute.

The front piers containing the boilers and engines are arranged to be propelled along the dock by power at the rate of 50 to 75 feet per minute. The back pier is arranged to be operated by hand. Both front and back piers have clamps for fastening them to the rails when necessary. Both piers are mounted on wheels of chilled charcoal iron ground true to tread. There are 10 wheels under each double pier and four wheels under each single pier. With each bridge is furnished one special 5-ton Fairbanks scale, so located along the length of the tramway that each load carried by the trolley can be weighed while moving along the bridge in its regular course with the scale beam on top of the bridges, or at any other convenient point.

In general, each of the bridges has sufficient power and strength of mechanism so that it will be able to take a loaded bucket from the hold of the vessel, hoist it and transport it to any distance on the bridge tramway, dump the load and return it to the hold of the vessel in one minute. The general factor of safety for the bridge construction is five for the moving load, and four for the dead and wind loads.

Advice to English Machine Tool Builders.—In concluding a series of articles on the development of the American machine tool business in Great Britain, a writer in the *Engineer* says: "To sum the matter up, if we are to maintain supremacy in the machine tool trade in the future, the following points must be borne in mind: 1. A more intimate knowledge of what is being done by others is essential. The time for concealing methods of manufacture has gone by, and a constant intercourse between makers is necessary to stimulate ideas, besides greatly increasing the opportunities of economic manufacture. 2. The system of specializing and confining one's attention to a limited variety of work is necessary for the perfecting of any class of machine, and for the reduction of cost of manufacture. 3. Those principles of trades unionism which tend to limit the capabilities of our workman, destroy his individuality and independence, or limit his capacity for production, must be eradicated. 4. Our workmen must be prepared to extend their hours of labor to a number per week at least equal to those of other countries. 5. Encouragement must be given to our workmen in suggesting improvements, and any legitimate ambition to better their position which they may possess should be cultivated. It is not too much to say that a very large portion of the success achieved by American machinery is due to the efforts of the American workman. Indeed, if the origin of many of the ingenious attachments on their tools be investigated, the larger portion of them will be found to have emanated from the workshop rather than from the drawing office; while a number of the principals of the best manufacturing concerns in America at the present day have risen from among the ranks of this class."

Protecting Iron Construction from Corrosion.

At a discussion of the Franklin Institute not long since, W. C. Furber, in speaking on the structural design of buildings, said:

On the question of rust protection, I may be taking advanced ground when I say I believe that entirely too little attention has been paid to this matter by designers, yet the liability of corrosion is so great, through exposure and improper covering and the lack of preparation of the metal to receive and hold the covering, that I think the use of the sand blast or some equally efficient means to remove the mill scale and permit the direct application of the protective covering to the actual surface of the metal is not only justifiable but imperative. When the skeleton is once inclosed, examination is difficult and repair practically impossible, and as the life of the building is coincident with the life of the frame work, and the value of the investment is determined primarily by the integrity of the finished structure, a short-sighted and temporarily apparent economy should not be allowed to curtail a proper expenditure on the skeleton, which, if intelligently made, will assure the building a practically indefinite existence.

As to the best means of providing against rust, the information already at our disposal seems to me sufficient to indicate a safe course to pursue. Ledebur, in an "Essay on Oxidation of Iron and its Admixtures, Rusting, and the Influence of Liquids upon Iron," points out that three factors are required to produce rust—that is, the hydrated oxide—viz., water, pure oxygen and an acid. Portland cement, by furnishing a base for the absorption of any acid likely to be found, will eliminate one of these factors, and will thereby prevent rust. So that, with the other valuable qualities it possesses, it forms a protective covering of great value. But while this is true if the cement is in direct contact with the metal, we know that as the shapes come from the shops they are covered with mill scale, and that any covering applied to them adheres to the scale, and that a mechanical separation of the scale is easily possible.

Should water penetrate the cement or other covering, through cracks, and find its way between the scale and the actual surface of the metal, the scale being electro-negative to the body of the metal, the elements of a battery exist, and the degree of corrosion is a matter of time. We also know that as concrete is frequently put in place the voids are not filled up, and spaces are left for the accumulation of water, which may be present, forming, with the scale already there, rust producing factors.

It is not an uncommon thing, where iron footings are placed below the water level, to find that the water has dissolved and washed out all the cement which the concrete originally contained. I have seen more than one building standing with its feet wet, the cement having been washed out before the concrete set, leaving but the stone and sand remaining.

I believe, and have followed it out in my own practice, in placing all iron above the line of saturation if at all possible, and in the Harrison Building, which has been referred to here to-night, and for which I was the designing engineer, the grillage of I-beams in the footings is above the water level, the foundations below this being entirely of concrete; but when for any reason the grillage or underground metal work has to be placed below the water level most extraordinary care should be used to see that the metal work is free from scale and unpainted; that the trenches or pits are so lined that no part of the excavation comes in contact with the beams; that the concrete contains a large proportion of cement, with the aggregate or filler in small particles, so as to allow being rammed easily into a dense mass without voids. In the placing of long girders underground it is not an uncommon thing to see the earth fall in around the girders, and to see the concrete filled in without the earth being removed. It is needless, perhaps, to say that whenever this occurs a fault is formed in the concrete, and rust must inevitably follow.

On the structural work above ground the danger of corrosion is not so great, but is sufficient, I think, to warrant the use of a concrete envelope around the columns and external girders, for the masonry covering is not always thick enough or tight enough to exclude moisture. If concrete is used the metal work should be temporarily protected by a coat of oil, which will be worn away by the time the building is ready for closing in.

The Secretary of the Navy has sent a letter to Chairman Hale of the Senate Committee on Naval Affairs, advocating the passage of a bill authorizing the use of stone instead of timber in the construction of the dry docks to be built at League Island, Philadelphia, and Mare Island, San Francisco, Cal.

The Most Perfect Machine Shop.*—III.

Building No. 16 of the Schenectady Works of the General Electric Company.

BY S. D. V. BURR.

Boring and Turning Mill.

The engraving, Fig. 21, illustrates a Bement, Miles & Co.'s 14 x 20 foot vertical boring and turning mill, electrically driven. The changes in the drive made indispensable by the introduction of the motor are shown in the plan view, Fig. 22, and the sectional front and end elevations Figs. 23 and 24. In the machine as originally designed and set up power was applied to a step cone

a coarse feed is being used by the other. Either head can be stopped, started or adjusted to feed in any direction independently of the other. There is a power arrangement for raising and lowering the cross head as well as for adjusting the uprights to any diameter from 14 to 20 feet.

The motor takes the place of the cone of the original construction. The armature shaft is prolonged so as to receive the gears indicated in Figs. 22 and 23 for giving different degrees of rapidity to the revolutions of the work table. This shaft when coupled directly with the driving gear of the machine imparts the most rapid motion to the table. The gears applied to the shaft for giving the different speeds are arranged to be connected with different back gears placed upon each side. One

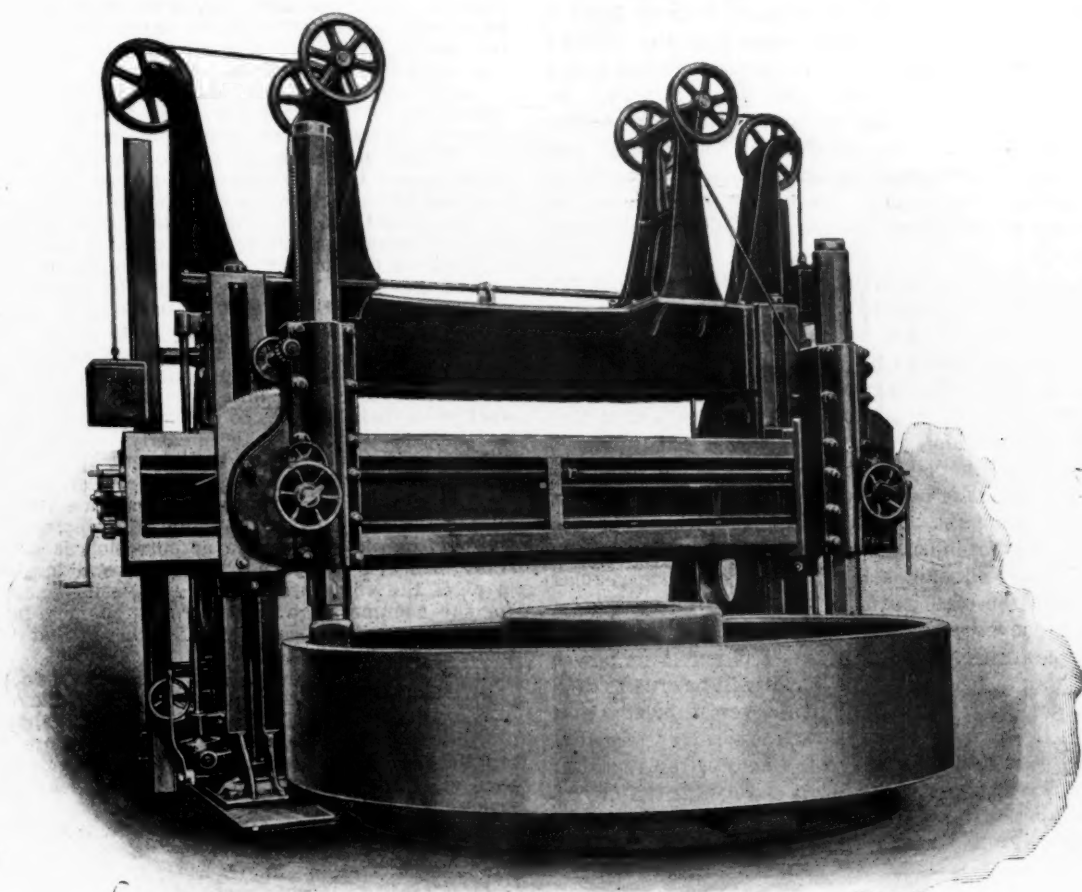


Fig. 21.—Bement, Miles & Co.'s Boring and Turning Mill Driven by Motor Under the Floor.

THE MOST PERFECT MACHINE SHOP.

having six changes for a 6-inch belt, the entire drive being made up of 70 feet of countershafts, 8 belts, 14 pulleys and two six-step cones. There were two sets of back gearing which could be instantly connected and disconnected by clutch levers to a pair of bevels and finally to a large spur gear on the table. This mechanism gave 24 changes of speed regularly graded to the different diameters to be turned. The ratio of gearing was 230. The cutter bars were arranged to be operated from the side upon which the workman usually stands, and either of the two cutter bars could be raised or lowered, or moved transversely in the same or opposite directions, by hand or power from this side of the machine. The cutter bars have a vertical or angular traverse of 66 inches and are independently counterweighted. The feeds are operated by friction disks which can be adjusted infinitesimally from 0 to 1 inch per revolution of the table while the machine is running. The gearing on the cross slide is so arranged that a fine feed can be taken with one head in any direction while

set of back gearing, when thrown into operation, gives a slower rate of speed to the table, while the throwing out of connection of this gearing and throwing in of another set gives a still slower rate of motion to the table. When the back gearing is applied the direct connection of the motor shaft with the driving gear of the machine is thrown out.

The whole arrangement is very similar to that of a large lathe head in which the cone may directly operate the face plate pinion or the cone may be thrown out of gear and various changes of back gearing applied. Other minor changes were made in the machine in order to adapt it to the electric drive. It will be readily seen that with a variable speed motor each of the different changes of gears can be varied in the rapidity of its action by means of the rheostat so as to obtain any desired rate.

The half-tone, Fig. 25, shows a Niles boring and turning mill electrically driven. It will be understood that in applying the motor to machines of this type the changes were governed by the design of the tool, but

*See *The Iron Age*, January 4 and January 11, 1900.

the object accomplished was the same in each instance. It is not necessary to enter into the details of all these different variations. One fact may be noted in all of these large tools; the new drive is entirely beneath the floor, there being no indication above ground of how the power is transmitted.

Group of Milling Machines.

Fig. 26 shows a group of Ingersoll milling machines. In each instance the motor is supported by brackets attached to the bed occupying the location of the original drive. In these machines no change was required except that called for by the motor itself and its imme-

The Federal Bankruptcy Law.

WASHINGTON, D. C., January 16, 1900.—The House Committee on the Judiciary will hold a meeting within a few days to determine whether any attempt shall be made to amend the new Federal bankruptcy law which took effect July 1, 1898. The subject will be very thoroughly canvassed by the committee and special attention will be given to the recommendations embodied in the annual report of the Attorney-General and in the bills that have been introduced during the present session. The general disposition of the committee is not to make any changes in the law at this time, on the ground that but a single full year has elapsed since the law went into force, and that a longer time is required to fully test the wisdom of

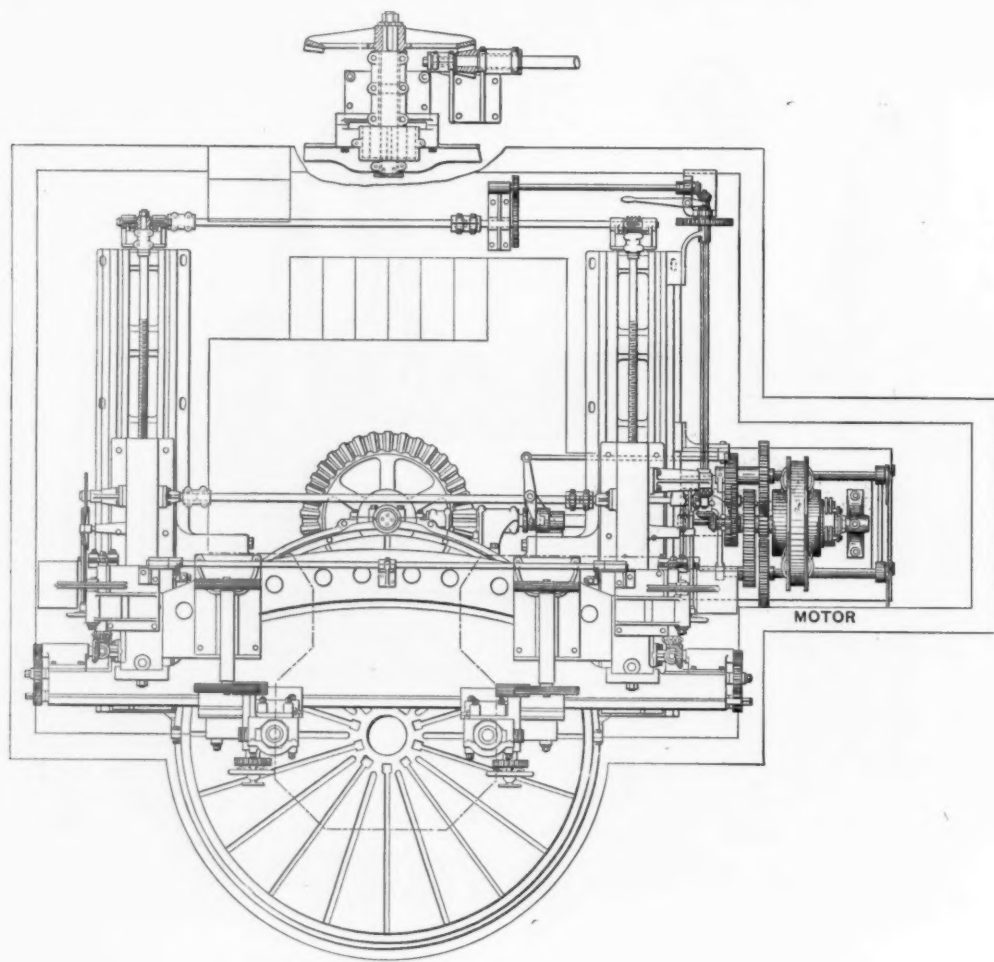


Fig. 22.—Sectional Plan of Fig. 21.

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plate gearing, all the rest of the machine remaining as it came from the makers.

(To be continued.)

The first electric launch to be used on the canals of Venice has recently made its appearance, no doubt much to the disgust of the gondollers. A syndicate composed of local gentlemen has taken the matter up and secured this first launch as a type of what they wish to run for passenger traffic on the canals subject to the approval of the local authority. The launch, which is called the "Alessandro Volta," provides accommodation for about 60 passengers. Its length is about 56 feet, and width 10 feet. It is equipped with 100 accumulators, and its mean speed will vary from 7 to 9 miles per hour.

Professor C. V. Boys, at a meeting of the Royal Institution in London, announced that the British torpedo boat destroyer "Viper," fitted with a Parsons turbine engine, reached a speed of 35½ knots at her trial. It was reported a short time ago that the "Viper" had accomplished 37 knots an hour.

its various provisions. A very strong effort is being made, however, by two classes of advocates of modification, and it remains to be seen whether the committee will be influenced by the representations that will be made before them.

The two classes referred to include those who desire the repeal of the entire law and those seeking to modify it with a view to increasing somewhat the difficulty experienced by bankrupts in securing discharges. In addition there are those who favor increased fees to referees, &c., and more or less important administrative provisions not affecting the principle of the statute. The advocates of repeal have secured the introduction of House bill No. 5295, which has been presented by Mr. Dolliver of Iowa, and which provides specifically that the act be repealed, stipulating, however, that such repeal shall in no way affect proceedings begun under the bankruptcy act prior to the taking effect of the repealing statute. It is safe to say that this bill is supported by so small a proportion of the business community that it stands no chance of passage in the present Congress. The new bankruptcy law is not without its severe critics in every part of the country, but the general consensus of opinion is that there is vastly more good than bad in it and that its repeal under two or three years would be a very grave misfortune.

The bill introduced in the Senate by Senator Perkins of California, and known as Senate bill 1287, has attracted considerable attention, for the reason that it amends four important sections of the present act. Its general tendency is toward increasing the cost of bankruptcy proceedings, which is deprecated by the committee, though justified to some extent by the rather narrow lines drawn in the original statute. It is proposed to amend section 20 by providing that referees shall be entitled to charge for administering oaths the fees charged by notaries or other officers in the several States, Territories or districts for similar services. The purpose of this amendment is to harmonize bankruptcy practice with that of local judicial procedure, and no special objection is raised to this amendment, as its effect will not be important. A much more significant change in the law is proposed in the amendment suggested in this bill to section 38, which

ernment under this amendment would be enormous and the Judiciary Committee is understood to be strongly opposed to it.

The bill also proposes an amendment to section 64 authorizing the courts to grant "such reasonable amounts for the use of office and for clerical assistance as may be necessary and proper." It is not believed that this amendment is necessary, for the reason that under the general provisions of the present law the courts are making very moderate allowances for fees and clerical assistance. Should the proposed amendment be adopted it is believed it would result in a very material increase in these allowances.

The Perkins bill also provides that two or more counties may be consolidated into one district under a single referee, if found necessary. The present practice of bankruptcy courts is to make this consolidation, though

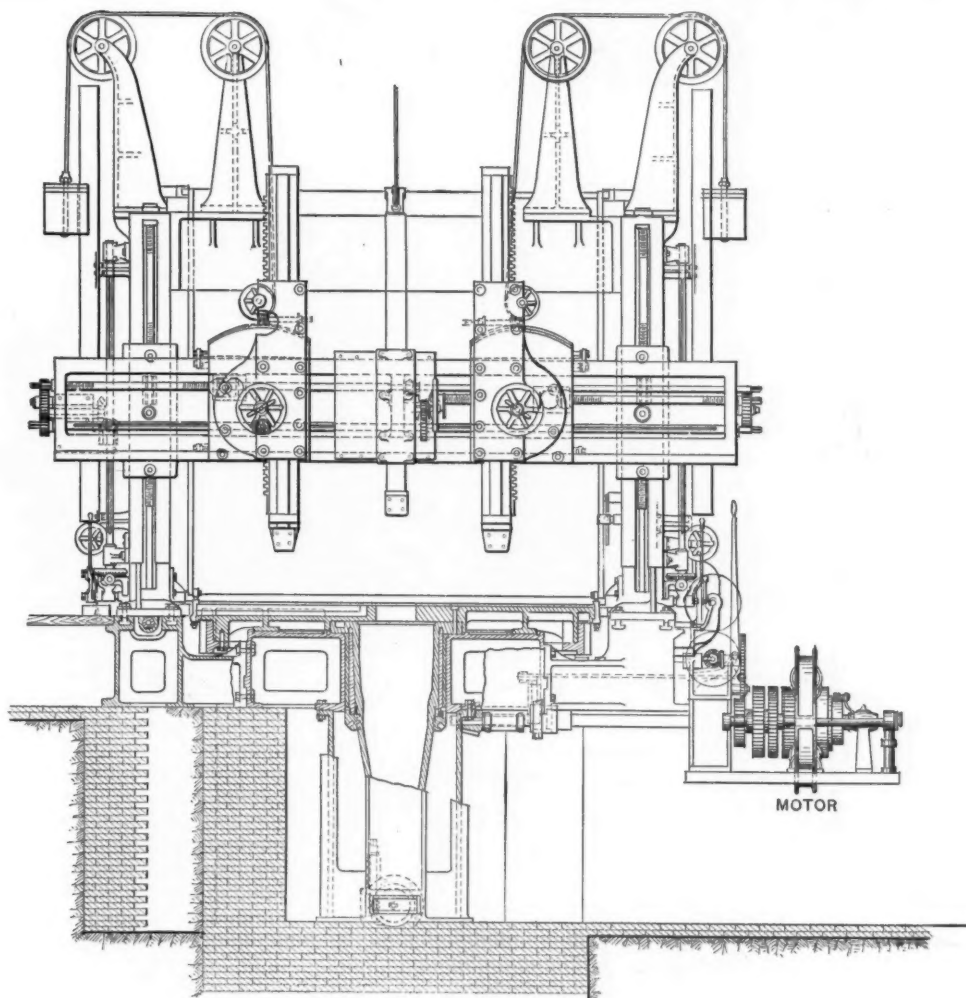


Fig. 23.—Sectional Front Elevation Fig. 21.

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deals with the jurisdiction of referees. The amendment is as follows:

"Provided, That orders of adjudication, orders confirming compositions and orders of discharge may be made, after a hearing, by a referee residing or having an office in the city or town where the office of the clerk of the court is situated, with the same force and effect as if the same were made by the judge. And provided further, That referees performing the above mentioned duties shall receive, in full compensation for all services to be performed under this act, an annual salary of \$4000, said salary to be paid out of the Treasury of the United States in the same manner as judges of the District Court are paid. Provided, That the \$10 fee prescribed to be paid as a fee to referees and the commissions earned by such referees shall be paid to the clerk by the bankrupt and trustee of bankrupt estates respectively, and said sums shall by the clerk be remitted to the Secretary of the Treasury."

The purpose of this amendment is to clothe referees with certain important functions restricted in the present law to judges of the courts of bankruptcy and to grant them salaries in lieu of fees and commissions, turning the latter into the Treasury. The increased cost to the Gov-

such proceeding is of doubtful authority. The adoption of the amendment would legalize the present practice, to which no objection has been raised on any other than a technical ground.

Representative Jett of Illinois has introduced a bill in the House which is regarded as of special importance chiefly because the amendment suggested by it covers a question upon which the courts have ruled adversely and is analogous to several other problems which are now before the bankruptcy tribunals in both the Eastern and Western jurisdictions. Mr. Jett's bill proposes to amend section 63 by adding the proviso that "nothing in this act shall be so construed as to apply to any order or decree entered by any State court decreeing or ordering the payment of alimony or providing for the support and maintenance of one's family." Certain bankruptcy courts have ruled that discharges secured under the Federal law do not free the petitioner from any obligations incurred under decrees of alimony. But the weight of the decisions thus far rendered has been to the effect that discharges operate to cancel all accrued obligations for alimony, but do not affect those that may accrue after the date of the discharge. In this connection the courts are also at variance on the question as to whether a dis-

charge in bankruptcy operates to relieve the petitioner from the obligations incurred under a lease, the weight of the decisions being to the effect that as a lease is an obligation which cannot be met after the surrender of a petitioner's assets it is therefore canceled by the decree of his discharge.

There is also a difference of opinion in the courts as to whether a seat in a stock exchange may properly be regarded as a part of a bankrupt's assets liable for his indebtedness, and the same question has been raised as to the right of property in liquor licenses issued to the petitioner. On one hand certain courts have held that, as a transfer of a seat in a stock exchange can only be made to the person who is able to secure admission to the exchange through the votes of its properly constituted officials, and for the reason that in many cases such seats carry life insurance features, they cannot be regarded as assets within the definitions of the Federal statute.

quired, when requested to do so, to issue certificates of search certifying as to the filing of all petitions, and in addition the bankruptcy indexes of judgments in the several courts are to be at all times open to inspection and examination by persons or corporations for the purpose of transcription or otherwise without any fee or charge therefor. The clerks issuing certificates of search would be entitled to receive the same fees as are now allowed by law for certificates as to judgments, and Mr. Elkins believes that they would be sufficiently remunerative to make it to the advantage of the clerk to compile the required indexes without other compensation.

The Attorney-General is not disposed to urge upon the attention of Congress the recommendations made in his annual report with a view to their enactment during the present session. His suggestions represent the results of careful observation of the law during the first year of its life, and should action looking to the amendment of the

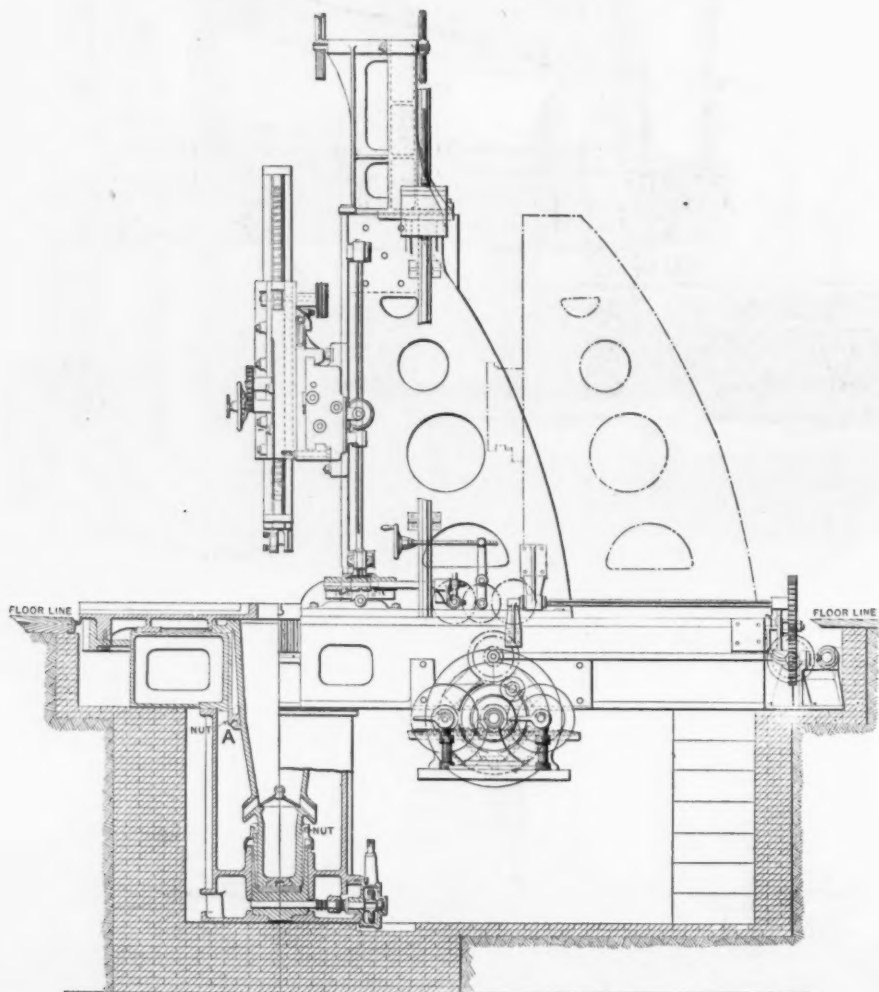


Fig. 24.—Sectional End Elevation Fig. 21.

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Similarly it has been held that, as a liquor license can only be transferred to a person who is acceptable to the authorities, its owner has no vested right in it entitling it to be considered as an asset of his estate. On the other hand, it has been ruled that however circumstantial the rights of a petitioner may be in such property his creditors are entitled to such proceeds therefrom as can be secured by an efficient administration of his estate by the trustees duly appointed.

It is pointed out that if a seat in a stock exchange or a liquor license were held to be exempt under the bankruptcy act its whole purpose could be defeated by the intending petitioner, who might easily invest his entire assets in such property without violating any of the provisions of the bankruptcy law. The good faith of such a proceeding might be questioned, but the difficulty of disproving it would be generally recognized.

The fourth measure suggesting an amendment to the bankruptcy law has been drawn by Senator Elkins of West Virginia and provides for the "preparation and custody of complete and convenient indexes of all petitions in bankruptcy filed in the several District Courts of the United States." The clerks of these courts are re-

statute be deferred another year it would meet with the Attorney-General's approval. In commenting upon the most important features of the law requiring the attention of Congress within the next year or two E. C. Brandenburg, in charge of bankruptcy matters in the Department of Justice, said to the correspondent of *The Iron Age*:

"The law really lacks only one or two changes to make it a most satisfactory statute. A few safeguards easily devised should be thrown about the granting of discharges, and a provision should be incorporated requiring petitioners who have secured previous discharges to pay a certain proportion of their debts before securing a subsequent discharge. Otherwise I think the law is the best statute that could possibly be devised for the protection of both the credit man and the debtor."

W. L. C.

A plan is on foot for the establishment in the near future of a permanent exposition of American manufactures in Constantinople, to serve as a center for the extension of the trade in American products in Turkey, Greece, the Levant, Egypt, the Balkan States and Southern Russia.

The Coke Trade in 1899.

The Connellsville, Pa., *Courier* of Saturday, January 13, reviews the coke trade of 1899 as follows: The coke trade of 1899 was by long odds the greatest in the history of the Connellsville coke region. Prices, too, were much better, the average being above any previous year, and the aggregate gross income of the Connellsville

contracts existing. The range in price for furnace coke during 1899 was from \$1.60 to \$2.75 a ton, with an average price of \$1.95, while foundry coke ranged from \$1.90 to \$3 a ton, with an average price of \$2.25. A careful estimate places the average price of the Connellsville region output of 1899 at \$2 a ton.

There were shipped out of the region during the year 523,203 cars of coke, containing 10,129,764 tons, which at the average price estimated above would yield a gross

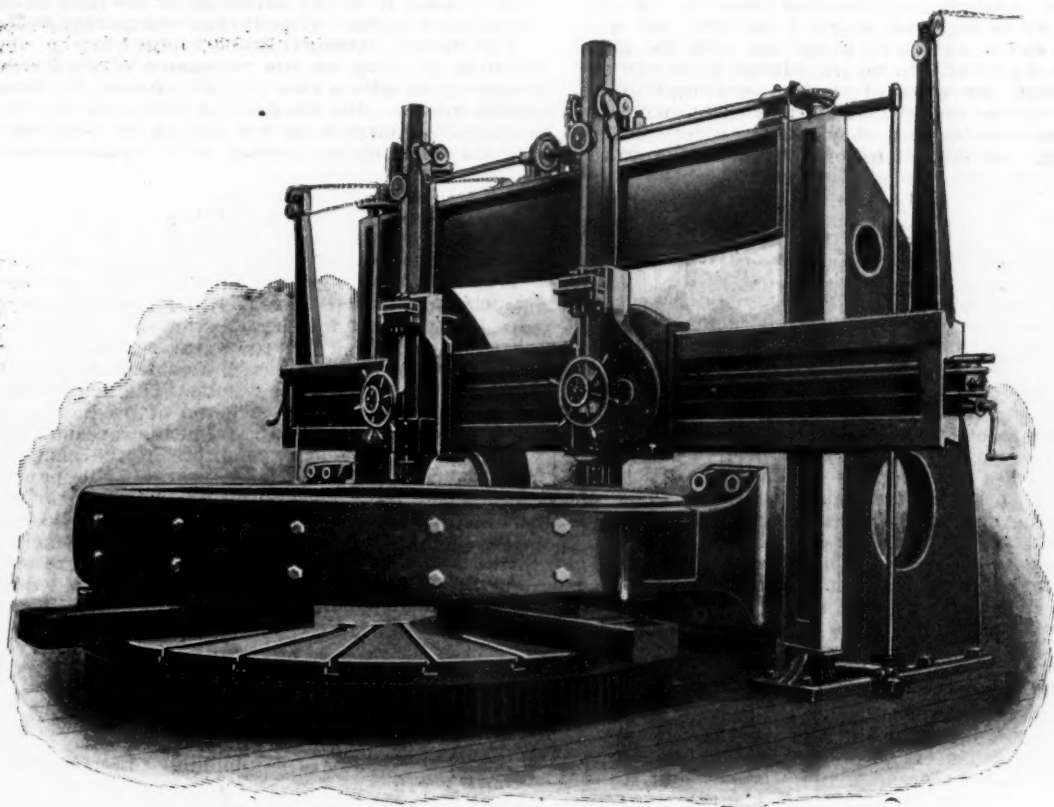


Fig. 25.—Niles Boring and Turning Mill with Motor Under the Floor.

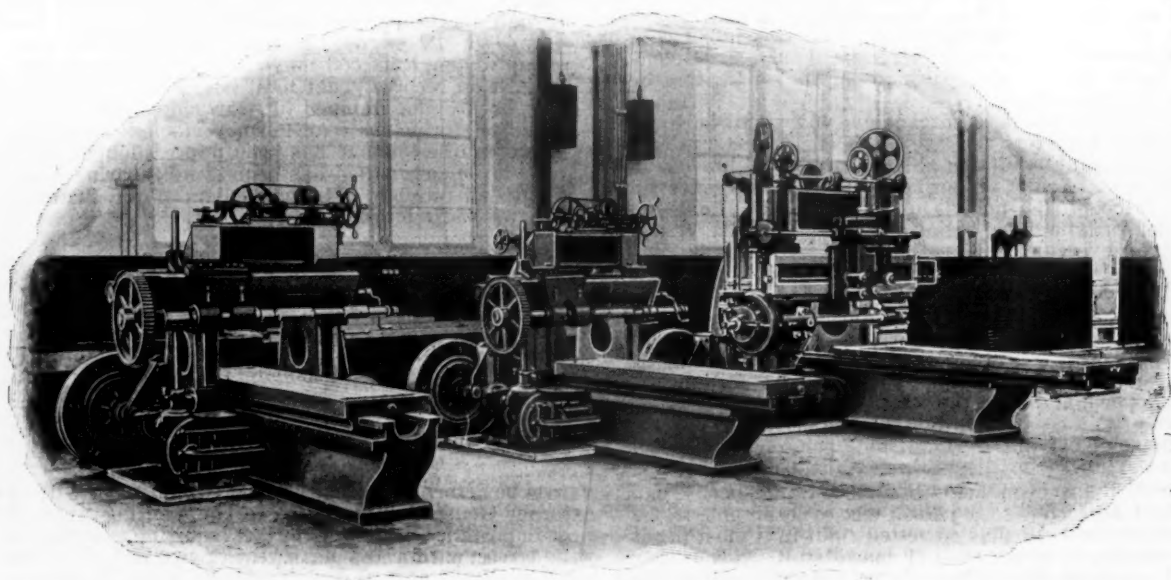


Fig. 26.—Group of Ingersoll Milling Machines Driven by Motors on the Bed.

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operators was fully 50 per cent. greater than the greatest year on record. In short all previous records were broken and far outclassed.

The result, however, was not wholly unexpected. Six months ago the *Courier* advised its readers that the coke output for 1899 would reach the enormous aggregate of 10,000,000 tons. The prediction has been more than verified. The prospects for the coming year are even brighter. At the present rate of progress the output of 1900 will exceed 11,000,000 tons, which will probably be sold at even better prices than those realized during the year just closed, when there were a number of low price

revenue of \$20,259,528 on board the cars at the ovens. For carrying this coke to its destination the railroads received not less than \$15,000,000.

During the year the Connellsville coke producers were not able to supply all the demands for coke within the borders of the United States, and for this reason there was little effort, if any, made to invade foreign markets. Some coke went to Canada and a small amount to Tampico, Mexico; but inquiries from Belgium, Australia, Switzerland and a few other points were unheeded.

As the demand for coke was much greater than the

supply, the year 1899 presented a direct contrast to 1898, in that new ovens were desired and at every tract of coal where conditions warranted more ovens were built. The result is that 1899 closed with a total of 19,689 ovens in the region as compared with 18,463 for the last week in 1898.

The list of new ovens is a long one. The H. C. Frick Coke Company erected 25 at United No. 3, 33 at Adelaide, 25 at Calumet and 50 at Oliphant. W. J. Rainey erected 200 on the Warden tract at Mt. Pleasant, has 150 almost completed at Mt. Braddock, has just completed 85 at Paul; Cambria Steel Company, 12 at the Mahoning plant; Oliver & Snyder Steel Company, 100 at Oliver No. 2; Bessemer Coke Company, 120 at the new Empire plant near Ruffsedale, Westmoreland County; Standard Coke Company, a new coke company, 80 at Ourne, near Smithfield, and the Acme Coke Company, another new company, 50 at the Acme plant, between Smithfield and Uniontown. These are the principal additions during the year.

The Zinc Miners' Association.

The Missouri and Kansas Zinc Miners' Association, which has become such an important factor in the zinc industry, has issued its first annual report, from which we quote:

In the entire history of zinc mining there has never been a year so satisfactory in its results as the one just closed. This association is the outgrowth of an intolerable system of ore buying which has been in vogue since the earliest sales of ore. This system had for its basis in fixing the price of ore naught but the whim and caprice of the ore buyer, whose boast it was that the price of jack was not governed or controlled in any manner by the price of spelter. This statement came to be accepted almost as a maxim in buying and selling ore, and in the face of an upward spelter and a downward jack market, rash, indeed, was the seller who dared refer to the actual situation in the presence of the ore buyer.

However, in December, 1898, being incensed at unwarranted and sweeping reductions in the price of ore, a few mining operators took it upon themselves to call together representative producers to propose a remedy, and as a result of several conferences, the Missouri and Kansas Zinc Miners' Association was formed with the avowed purpose in view of bringing about an equitable change in ore buying whereby sales of zinc ore should be made from week to week at a price governed by its actual metallic value at the time of sale. In establishing a basis, ore assaying 60 per cent. was taken as a standard, and due allowances were made for all costs connected with the conversion of a ton of zinc ore to spelter, delivery to the metal market, and reasonable profit for the treatment and handling thereof.

After intelligent researches and investigation by your Board of Directors the "seven to one" rate was agreed upon as being equitable alike to producers and smelters—i. e., 1 ton of 60 per cent. ore is worth seven times the value of 100 pounds of spelter at St. Louis, with proper variations for ore of a different quality.

After overcoming many obstacles your association has succeeded in establishing this new basis of zinc ore value until now the price of every ton of ore sold in this district is based upon its intrinsic value as determined by assay. As to the substantial results to producers, the following figures tell the story: During the year 1898, without the association, the average price of zinc ore was \$25.25 per ton; during the year 1899, through the effective work of the association, the average price was \$37, or an increase of \$11.75 per ton, or 46½ per cent. This means that on all ore produced during the past year—255,000 tons—the producers were directly benefited in the sum of \$3,000,000. Had the same average price of 1899 been received for ore the output of 1898—235,000 tons—the district would have been benefited in 1898 to the extent of \$2,760,000. We have no reason to believe that the price of ore in 1899 without the association would have been any different than in 1898. The association also clung to the theory that ore production, in a measure, should govern the price of spelter. During the year 1898 the average price of spelter in St. Louis was \$4.57 per 100 pounds, while during 1899 the average price of spelter was \$5.84, or an increase of 27 8-10 per cent., and this advance was made despite the fact that the spelter situation of last year was not as favorable as during the year preceding. If there are some who may deny to the association credit for the advance in spelter for 1899, upon what can the association then stand? The figures are unanswerable. Spelter advanced but 27 8-10 per cent., while blende advanced 46½ per cent., or a difference in favor of the association of 18 7-10 per cent. net.

This increase in the amount of ore produced amounts to the sum of \$1,225,000 left in the pockets of the producers rather than in the tills of the smelters, being

at the rate of \$4.82 per ton. With this showing can there be any doubt in the minds of the pessimists as to whether the association had paid for itself and whether it should have the financial and moral support of every producer in the district? To bring about these results measures have been taken from time to time by your board with which you have been kept familiar. Others of a more secret nature have been taken which even now it does not seem advisable to divulge.

To those who fear the association may maintain such prices as will cause a tremendous overproduction in the district, we refer for comparison to the figures previously mentioned. Comparing 1899 with 1898, an increase of 27½ per cent. in the price of spelter, 46½ per cent. in the price of blende and but 8 7-10 per cent. increase in the gross amount of production. As to the matter of finances any paying member will be shown the books of account at the office upon request, hence no general statement will be made at this time.

The affairs of the association have been economically administered, the secretary being the only official under salary. The time of the members of the board has been given without hope of reward except for the benefits derived from their efforts in common with other producers. Much more effective work could have been performed by the board had it been better provided with funds. Frequently during the past year occasions have arisen whereby money could have been used to advantage in bringing about desirable results. The amount asked for, 25 cents per week per each ton of production, is insignificant compared with the tremendous results attainable under the intelligent expenditure of the money derived from such a source during a year. If this payment had been made by producers during the past year, the association would now have a fund of at least \$50,000. With such a nucleus the erection of a producers' smelter would be a simple proposition. The matter has received consideration and fields have been investigated during the year. A more complete report may be furnished at a future time.

Shipbuilding in Britain in 1899.

"The year which is just closing is the most memorable in the history of shipbuilding," remarks the *London Statist*. "It is the year of the biggest total in the volume of, and of the largest and most finished types in the items of, production. It has been a year also of unprecedented development in the output of other countries than Great Britain. Our present purpose is an analysis and survey of the British industry; but we may say that, although all the returns are not yet to hand, the world's output in 1899 was not less than 2,500,000 tons, or, roundly, about 500,000 tons more than that of 1898, the highest on record. That total is, no doubt, considerably swollen by the number of war ships that have been launched during the year, but nevertheless the production of mercantile tonnage has been unprecedented. And yet the cost of production has been steadily rising month by month all through. The particulars of the British trade for two years follow:

Districts.	1899. Tons.	1898. Tons.
Scotland—		
Clyde.....	491,074	466,832
Forth.....	15,642	26,624
Tay.....	17,908	14,292
Dee.....	11,973	7,449
Totals.....	539,597	515,197
Tyne.....	307,961	307,824
Wear.....	268,503	262,969
Tees.....	144,101	145,624
Hartlepoons.....	139,600	119,040
Humber.....	32,287	33,880
Mersey.....	13,584	4,026
Thames.....	21,205	38,294
Ireland.....	131,723	121,330
Barrow and other ports.....	66,887	51,079
Government yards.....	69,100	73,090
Totals United Kingdom.....	1,731,543	1,661,853

Thus the Clyde produces more than a fourth of the whole new shipping of the United Kingdom."

Dr. Coleman Sellers, chief engineer of the Niagara Falls Power Company, and William A. Brackenridge, resident engineer of the same company, have gone to Geneva, Switzerland, where they will meet the famous Swiss engineers, Piccard and Pictet. They will consult with them on the advisability of making changes in the turbines to be installed in the new wheel pit now in building for the Niagara Falls Power Company. It will be recalled that MM. Piccard and Pictet designed the turbines in the present wheel pit. While the turbines were designed in Switzerland they are made by the I. P. Morris Company of Philadelphia, where no doubt the turbines for the new pit will be made on the improved pattern, if it is adopted.

The Continuous System as Applied to the Rolling of Merchant Steel.

The publication of several phenomenal records in the rolling of merchant bar on the Morgan mill in the works of the National Steel Company, at Mingo Junction, Ohio, having aroused more than general interest among rolling mill owners in this country and abroad, we present the following description of the system employed:

Four merchant mills of this type have been designed by the Morgan Construction Company of Worcester, Mass., three for the Pittsburgh district (now in operation), and one now in process of construction for a party in Europe. Special limitations of a local character having in each case called for slightly varying treatment, it has been thought best to illustrate the system by means of a composite plan of the four mills, which will be more comprehensive than the plan of any single mill.

Referring to the plan presented, it will be noted that so far as possible the continuous principle has been employed, and that every part of the equipment is radically different from the usual practice in manufacture of merchant bar.

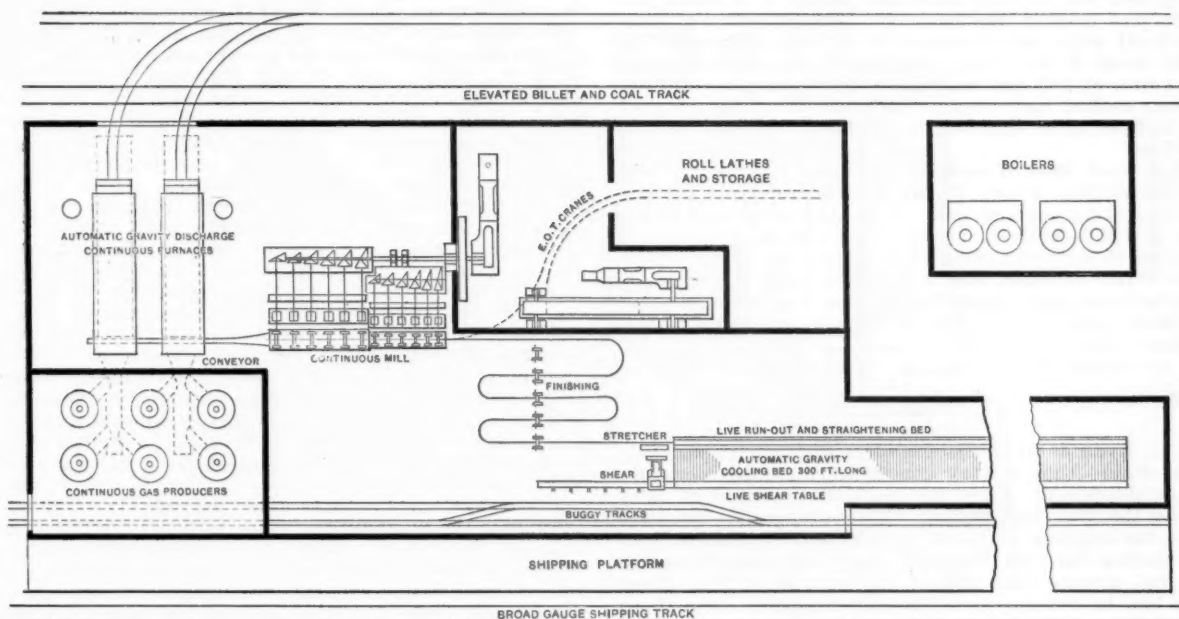
The plant may be, for purposes of explanation, divided into three distinct parts—*i. e.*, heating furnaces, rolling mills and cooling beds.

The Heating Furnace.—The earliest continuous heating furnaces in common use were those designed and

treatment, and the heating is done so thoroughly that the metal is soft to the center. Under these conditions the metal is in condition for rolling at a heat which would seem low to one used to the older methods, where the outside of the billet is brought almost, if not quite, to a dripping heat before rolling.

The Allen furnace does admirable heating, and the item of labor in charging is low. The heater's labor, however, is very severe, and quite as much skill is required to maintain a suitable bottom in the Allen furnace as in any form of reheating furnace. In 1895 a bold advance was made by Mr. Morgan, who designed and built the first gravity discharge furnace, as it has been called.

The billets were charged into the cool end of the furnace, and advanced through zones of increasing temperature until they reached the point of highest heat, where, meeting a sharp incline in the pipe skids, they were discharged one by one by gravity, falling upon a feed table at the end of the furnace, upon which they were carried promptly to the rolls, where the first pass was entered automatically. The results obtained were very striking; the labor of drawing the hot metal and telegraphing it to the rolls was eliminated; the furnace bottom was replaced by pipe skids the entire length of the furnace; the great waste from cinder was overcome, and the heater, his hard work having disappeared, became an attendant whose main duty was to see that gas and air were admitted to the furnace in the proper proportions. This change in furnace design re-



COMPOSITE PLAN OF FOUR MORGAN MERCHANT MILLS.

built by Gustav Ekman, the eminent Swedish metallurgist, prior to 1848. About 20 years ago William Allen of England added to the Ekman furnace a mechanical billet charger and water pipe skids for supporting the metal, thus eliminating much of the severe labor incident to the earlier types of continuous furnace. In 1891 two continuous furnaces of the Allen type were built by Chas. W. Morgan for the Pittsburgh Wire Company of Braddock, Pa. These furnaces were small, but have done splendid work, and it is believed that they still hold the record for output considering the size of furnace. After the success of the furnaces at Braddock, a number of similar furnaces were put in for different American manufacturers, and it is also interesting to note that a manufacturer of Sheffield, England (the home of Allen), came to Worcester and ordered a furnace for his works.

The old plan of charging heats into a furnace had many detrimental features; some of the billets remain in the furnace fully double the time that others in the same heat do, thus increasing the loss from oxidation. Those which remain longest in the furnace are liable to be seriously overheated, while the billets first drawn, although appearing hot and soft on the surface, as a matter of fact are comparatively cool and hard in the center; the condition being expressed by one roller thus, "Like it had a bone in it." In the continuous furnace the billets are charged mechanically into the cool end, and advanced gradually and uniformly through zones of constantly increasing temperature until the point of highest heat is reached, when they are withdrawn and rolled. Every billet thus receives identically the same heat

duced the costs of heating labor and waste to a fraction of what at that time had been considered the very best practice.

One point noticeable in the management of a continuous furnace is that it is more sensitive to fluctuations in the quality or quantity of gas supplied than is the Siemens furnace. A uniform supply of gas can only be made under continuous conditions, which are obtained by means of the Bildt continuous feed device and spreader for gas producers.

The Rolling Mills.—A conveyor delivers the heated 4 x 4 inch billet to the first pass of a train of continuous rolls, in which it is reduced to a section of ½ inch square or larger as desired, and then finished accurately on a hand mill, from which it issues directly upon the cooling bed.

The Cooling Bed.—A long conveyor running slightly faster than the finishing rolls receives the bar as it is finished and removes it from the mill. After the whole length of the piece is finished, one end is caught in a grip attached to a steam stretcher engine, while a boy secures the other end in an adjustable anchor grip and the bar is pulled straight. Both the stretcher engine and anchor grip being out of line with the conveyor, the pulling taut performs a double function—*i. e.*, straightening the bar and removing it from the conveyor. On relaxing the strain the bar settles upon an inclined cooling bed, where it is maintained straight by resting in the angle formed by the sloping supports of the cooling bed on one side and a series of removable fingers on the other. When the succeeding bar is ready to stretch, the fingers are temporarily removed, and the bar slides a

few inches down the incline, where it is arrested by another series of fingers, leaving its former position ready for the next bar. These fingers, or stops, are all connected and constitute a systematic escapement, operated by a small steam cylinder controlled by a boy, by which means the cooling bars move down the incline intermittently, but are at all times after stretching kept straight.

Upon reaching the foot of the slope the cooled bars are mechanically grouped on a narrow level bed, where these groups of 10 or 20 bars are transferred to the shear table, upon which they are carried to a quick working shear. After cutting to the required length, the bars are loaded directly into cars for shipment in case of large orders, or loaded onto small trucks to be held to make up mixed specifications.

Economies of the System.—The cost of heating is reduced to a minimum in point of fuel used per ton of metal heated, as well as heating, labor and loss from oxidation.

The use of a continuous mill for the larger part of the reduction in section causes a very considerable saving in the amount of power required, as the metal is reduced quickly while hot and is not subject to the rapid cooling caused by long contact with the mill floor or the atmosphere, and at the same time the amount of oxidation is much less, the period of exposure to the air in a continuous mill being but one-fifth of that in the usual Belgian or looping system.

Bars 300 feet in length are finished, which reduces the scrap loss due to crop ends and shorts to a small percentage of what it was formerly. When the first of these merchant mills was designed bars were ordinarily finished about 40 feet long, and the owners considered an allowance of 100 feet to be generous. After careful discussion cooling beds of about 200 feet long were adopted, but in later mills this length has been increased to over 300 feet.

Hot steel bars of this length cooling upon the cooling bed present a very favorable opportunity to observe an interesting phenomenon. Watching either end of the bars it will be noticed that they contract rapidly at first, then less rapidly and, finally the contraction ceases; then, after a few seconds, slow expansion takes place, which soon becomes more rapid, then ceases and is followed by the final contraction. This expansion in cooling often amounts to 2 or 3 inches in bars over 200 feet long, and the movement is rapid enough to be easily followed by the eye.

J. J. Ryan & Co., brass founders and machinists, Chicago, state that a very comfortable feeling pervades the establishment, when reviewing the account of sales during the year just ending. The comparative footings show the tonnage in brass, bronze and aluminum castings during the year has been something more than 300 per cent. greater than that of any year since 1893. They have had to increase their foundry facilities three times during the year in order to keep up with orders. Their trade in Babbitt metals has increased in the same ratio as castings, orders for nickel genuine Babbitt and I X L Babbitt showing them to be the favorites in their list. In their machine shop every tool has been in use for the first time since 1893. Their equipment in this department has been increased by the addition of milling machines and a number of other tools. The polishing, electro-plating and metal pattern departments have been keeping pace with the balance by running almost up to full capacity. The month of December showed a slight falling off from the figures set by previous months, due no doubt to the general stock taking. They look confidently, however, for a big trade in the coming year.

The American Machinery Company, manufacturers of wood trimmers, Grand Rapids, Mich., are distributing as a holiday souvenir a vest pocket postage stamp book. It is artistically bound in celluloid covers, with a calendar for 1900 running through the leaves.

On the 10th inst. the Abbott Mitchell Iron & Steel Company began operations in their new works at Belleville. The rolling of the first iron was made an occasion of civic importance, the mayor, the county member and a crowd of leading citizens being present, including Sir Mackenzie Bowell, Senator and ex-Premier of Canada. There was considerable speechmaking. The works have orders on hand that will keep them busy night and day for some time.

Great activity is promised this year in the building of electric railroads between towns. Some important projects are announced, which involve quite a mileage of new track. The business originating in this direction will undoubtedly prove an important factor in contributing to the continued prosperity of the iron trade.

The Mesaba Range in 1900.

DULUTH, January 18, 1900.—That the Mesaba will add to its lead of the past year during the coming shipping season there is no question, and that it will send out more ore than any two ranges of the district there is little doubt. With the need for its soft ore has come, as might have been expected, the ability to handle larger and larger percentages in the furnaces. So far no experiments have been made with 100 per cent. of this ore without occasional slips and explosions, but these have in the latest practice been reduced to a minimum. It cannot be definitely said, however, that it is safe to use all Mesaba, although the work of John M. Thomas of the Duluth Furnace is quite satisfactory.

New Mines.

There will be a number of new mines opened on the range during the year. Among these is the Stevens, a property belonging to the Oliver Mining Company and regarded by them as one of their most valuable possessions, though it is not high in iron, but by reason of its excellent physical character, the ore being of a texture more like Vermillion hard than anything found on the range, with one exception. The Stevens has a proved ore body of 80,000,000 to 40,000,000 tons, is under a low royalty and a reasonable annual minimum, and there is so little surface covering of earth that it can probably be mined open pit. It is the most easterly deposit of importance known on the range. The Elba mine, lying on the line between ranges 16 and 17, was opened a year ago, but has produced no ore, on account of local difficulties. It will mine 100,000 tons the present year probably. It is an underground mine of high class and the property of the Minnesota Iron Company. Just west of it the Malta mine, closely affiliated with Minnesota Iron, will be a shipper of importance. Explorations have shown a large body of excellent ore. Five miles west of it is the Spruce mine, under lease to P. L. Kimberley, where at least 100,000 tons will be mined this year. It is a large deposit of a fine Bessemer. In connection with this the old Cloquet, virtually a new mine, will be operated extensively. Both are underground, and a shaft has been sunk at the Spruce during the past few weeks far down into ore. Fifteen miles further west the American Mining Company have a lease of the Clark mine, from which they intend to ship 100,000 tons this year. The work of development is under way, with some old Chandler mining captains in charge. This also is a large body. This mine is 3 miles east from Hibbing. Three miles west of that place lies a very large body of ore under a light surface, explored some years ago by pits and drills and discovered to have at least 8,000,000 tons of high grade ore, which is to be opened by Corrigan, McKinney & Co. The mine belongs to the Eastern Minnesota Railway Company, and will pay that road a royalty and transportation charge. Its lessees have secured all the Eastern's lands on the range, some 5000 acres, and will explore them. It was from these lands that the three or four great Mahoning mines were taken. Only one of these Mahoning mines has yet been entered upon and it may be years before the others are touched.

Old Mines.

Old properties are to be extended and developed. Not a mine on the range, with the exception of the Canton, but can add to its output of 1899. Beginning at the east end the Hale and Kanawha are being stripped and developed and will increase their output four-fold; the Williams has been shown to have ten times the ore that was supposed to exist there; the Biwabik has since the close of the shipping season been so changed that double the mining of any past year can be done at less expense than any past season's output cost; the stripped area at Sparta is enlarged; the Ohio is more of a mine than ever, with additional stripping going on all the time; the Oliver is being prepared for easy and heavy work; the Auburn is to have a second stripped pit for milling operations, giving it nearly double the old capacity; the Adams will have five shafts instead of three, but will have no surface pits as in the past; the Fayal has started out for an output of 1,250,000 tons and can make it if there is no hindrance, though such a quantity is enormous and means far more than the mere figures indicate; the Lake Superior Consolidated Hibbing group will increase heavily and the Mahoning is expected to add 20 per cent. to its work of the past year; the Penobscot will also increase with the installation of new pumps and a better system.

Explorations.

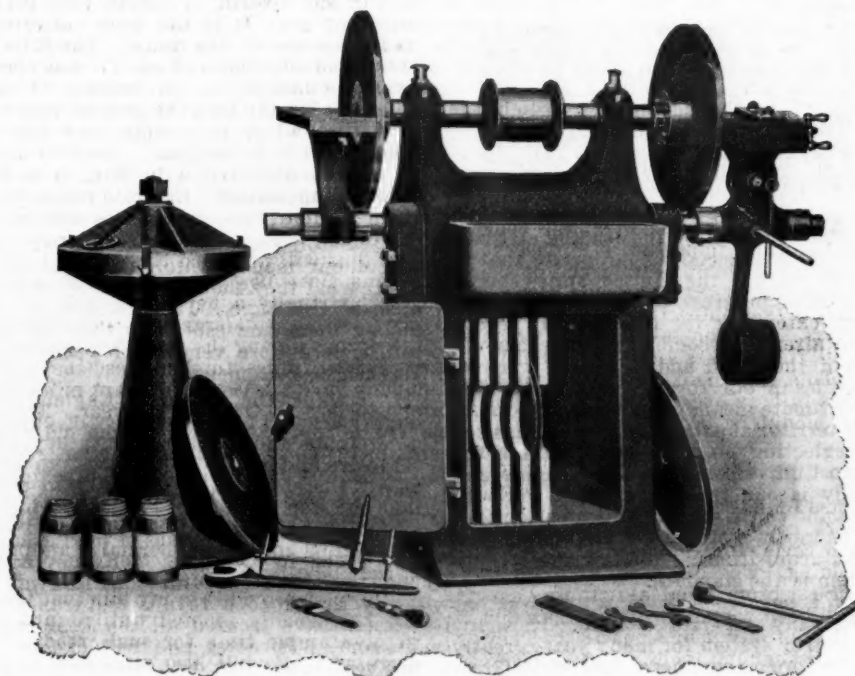
So much for old mines. As to explorations, there is a continuance of activity and a good return for the work. By exploration at one mine that few people ever heard of and still less know the location of the Minnesota Iron Company have added 21,000,000 tons to their reserves. Much additional ore has been found in the Virginia group

and along the south side of town 59—17, where several crews are now working. There is likely to be ore nearly from Virginia to the Mountain Iron, and in sections 2, 8, 10 and 11, east and south of the latter place, several heavy parties are finding ore. Among these are the Oliver Company, who have a lease on many acres there. West of the Mountain Iron ore is being found, and in the adjoining township, 58—19, many ore bodies are coming to light. Here the Minnesota Iron Company have many millions of tons and here they will build a railway later. Across the town line, in 20, the Chandler Iron Company have found ore, and from their property clear across the township, 6 miles, there are great bodies of ore. Within a radius of 3 miles of Hibbing there will be half a dozen new mines on ore now shown, and varying in depth to over 200 feet. West of Hibbing the Corrigan, McKinney & Co. explorations are expected to disclose new ores, and there are other bodies, some of them of importance. Almost without exception every State mineral lease lying anywhere near the line of the Mesaba deposits has been taken in the past few months, and the best located of these will be explored or examined carefully very soon.

The work that has been done so far has shown a width of the ore bearing member greater than earlier explorers dared to hope, and a wealth of ore in this member greater than was believed possible. Frequently new discoveries

of the flag produced the effect of a stream of red, white and blue fire extending 10 or 12 feet beyond the searchlight reflector. Mr. Eddy believes that his experiments prove a new system of war signaling, involving a great variety of color and light effects visible from a great distance, can be developed by the aid of kites and acetylene illumination.

The Miller Engineering Company.—Application for a charter of incorporation for the Miller Engineering Company of Pittsburgh has been made, and will be granted early in February. The new concern will take over the present business of Miller Brothers & Co., engineers and contractors, with offices in the Tradesmen's Building, Pittsburgh, and builders of blast furnaces, iron and steel works, open hearth, tube welding, heating and annealing furnaces and gas producers. The concern at present have a very large amount of work on hand, among which are four 50-ton Wellman tilting open hearth furnaces for the American Steel & Wire Company, at Newburg, Cleveland, with soaking pits for same; a blast furnace of the Kennedy type, 100 x 23 feet, for the same plant; a 50-ton open hearth furnace with necessary gas producers for the Latrobe Steel & Coupler Company, Melrose Park, Chicago; six pairs gas



THE RANSOM DISK GRINDER.

are made that still further widen this member and its ore, and it is not impossible that it may be extended to the east and west by later developments. It is evident that many so think, for State and other leases have recently been taken far beyond the present extremes of the range, and while these are mere speculations they indicate the general trend of opinion.

D. E. W.

The Ransom Disk Grinder.

The right hand table of the disk grinder built by Perry Ransom of Oshkosh, Wis., is provided with a bevel protractor which, in combination with the tipping of the table, makes it possible to grind any angle. The cross feed screw has a micrometer reading to thousandths of an inch, and by means of which pieces can be ground to exact thickness; parallel surfaces can also be ground. The tops of the tables are hand scraped to surface plate. The arbors are made of crucible steel and run in engine lathe boxes with hard fiber washers, backed up by jam nuts to take up the end wear. The table on the right side is formed with T slots which enable the operator to fasten on any special chucks or gauges.

William A. Eddy of Bayonne, N. J., the well-known kite expert, a few evenings ago demonstrated the possibility of using acetylene gas for night signaling from kites high in the air. He succeeded in sending up a flag 800 feet by means of kites and then illuminating it with a 100 candle power acetylene light. The rapid fluttering

annealing furnaces, with Talbot producers, for the Union Malleable Company, Moline, Ill.; two Lauth furnaces for the Harrisburg Rolling Mill Company, at Harrisburg, Pa., and one furnace of the same type for the Pittsburgh Locomotive Works, Allegheny, Pa. The concern are also doing considerable work for the Burden Iron Company, at Troy, N. Y.; also for the American Steel & Wire Company, Worcester, Mass. Their business last year was very much the largest of any one year in their history, and they have adopted the corporate form of partnership to provide additional working capital to take care of the very large extension of their business. In a short time the offices of this concern will be removed to the Westinghouse Building, Penn avenue and Ninth street, Pittsburgh. A suite of rooms vacated by the Allegheny County Light Company will be occupied.

The Leadville (Col.) *Democrat* says that "manganese iron ore suitable for the Chicago Steel Works is not so plentiful as those who are engaged in its shipment would desire. There is no doubt but that the manganese ore body in the Catalpa-Crescent is one of the most remarkable in the world in regard to size, percentage of manganese and freedom from deleterious substances. But this body is not exhaustless, and during the past few months the management of the Catalpa-Crescent have found it necessary to do a considerable amount of development work. While there is no danger of a cutting off of the manganese supply it is probable that until the mine can be further opened up there will be a falling off in tonnage."

The Metric System.

WASHINGTON, D. C., January 16, 1900.—A vigorous movement has been undertaken in Congress to secure the adoption of the metric system of weights and measures beginning January 1, 1901, with the understanding that the system shall not be compulsory upon the people until the beginning of the year 1902. Within the past week a measure has been introduced by Representative Shafroth of Colorado providing for the adoption of the system for all purposes except the completion of the land surveys which have already been begun upon the English system and which cannot well be finished on any other basis without producing unnecessary confusion. Mr. Shafroth's bill is as follows:

"Be it enacted, &c., That from and after the first day of January, 1901, all the departments of the Government of the United States, in the transaction of all business requiring the use of weight and measurement, except in completing the survey of public lands, shall employ and use only the weights and measures of the metric system; and from the first day of January, 1902, the weights and measures of the metric system shall be the legal standard weights and measures in the United States."

It will be seen that this measure is similar in its most important features to that presented in the Fifty-fifth Congress by Representative Stone of Pennsylvania and which passed the House but was subsequently re-committed by a narrow majority. Mr. Shafroth has brought the measure forward at the solicitation of a large number of advocates of the adoption of the system, including the National Metrological Association, of which Prof. J. Howard Gore of Columbian University of this city is secretary. With regard to the advantages which the advocates of this bill assert would accrue from its passage Mr. Shafroth said to the correspondent of *The Iron Age*:

"In my opinion the time has now arrived when we should abandon the time honored, cumbersome English system of weights and measures and adopt the method which has already been accepted by the leading civilized nations of the world. It is especially appropriate that in entering upon a new century the United States should step into the front rank of progress, adopting well tried, modern methods of extending its influence in every direction. We have already become one of the leading commercial nations of the world and in recent years we have made rapid strides in our foreign commerce. We are employing all legitimate means to extend our foreign trade and our recent territorial expansion has emphasized the importance of neglecting no step so important as the adoption of this almost universal system of weights and measures. Especially is our trade expanding in South and Central America and in the Orient, an expansion that in the future will be much more rapid than in the past owing to our recent acquisitions. In all of these countries the metric system is the standard."

"In the markets I have mentioned we find as our chief competitors Germany and Great Britain. Germany has employed the metric system for many years greatly to the advantage of her foreign commerce, and while Great Britain has always controlled a large foreign trade there is ample evidence in the reports of her consuls and of her leading trade bodies that the adoption of the metric system would have enabled her manufacturers, merchants and exporters to resist more effectively the encroachments of Germany and other nations. English merchants have been obliged to employ trade price-lists in which both the English and the metric system are used, and in addition the good offices of English banks throughout the world have been invoked to extend and maintain British commerce. How much greater England's supremacy would have been had she adopted the metric system 20 years ago can only be imagined."

"I am well aware that there has always been a strong prejudice among many important manufacturers of machinery, tools, &c., against the adoption of the metric system, but I think that this prejudice is gradually disappearing and will grow less and less as our foreign trade expands. In no department of American manufacture has there been so important a decrease in importations and increase in exportations as in the iron and steel trade. We are putting our manufactures of metal into every market of the world in rapidly increasing quantities, but there can be no doubt that if gauges, weights, dimensions and measurements of all kinds which we employ were based upon the almost universally adopted metric system our manufacturers could make and sell large quantities of goods which they cannot now place abroad. It is significant that so long ago as 1896, when the Stone bill was pending in the House, the Association of American Steel Manufacturers, at a meeting held in Steelton, Pa., adopted the following resolutions:

"Resolved, That this association hereby indorses House of Representatives bill No. 7251 establishing the metric system of weights and measures and requesting that the individual members of the association correspond with their Representatives and Senators urging its passage."

"The firms and corporations represented at the meeting were as follows: Jones & Laughlins, Pittsburgh, Pa.; Carnegie Steel Company, Pittsburgh, Pa.; Cambria Iron & Steel Company, Johnstown, Pa.; Bethlehem Iron Company, South Bethlehem, Pa.; Central Iron Works, Harrisburg, Pa.; Pottstown Iron Company, Pottstown, Pa.; Illinois Steel Company, Chicago, Ill.; Carbon Steel Company, Pittsburgh, Pa.; Park, Brother & Co., Pittsburgh, Pa.; Lukens Iron & Steel Company, Coatesville, Pa.; Pennsylvania Steel Company, Steelton, Pa.; Colorado Fuel & Iron Company, Pueblo, Col."

"About the same time the Philadelphia Engineers' Club adopted similar resolutions advocating the metric system and other engineering experts gave it their hearty support. The testimony as to the adoption of this system by other nations, especially concerning the embarrassments encountered during the period of transition from the old to the new systems, is all to the effect that the change has been made without any serious difficulty. Germany changed to the compulsory system in two years and Austria in three without friction or trouble. Merchants displayed the new weights and measures in advance, curiosity fixed them in the minds of the people, pride in displaying their ability to grasp the use of them led people to call for commodities in their new terms in advance of the prescribed time, and when the time came to make the change it was already made. Mr. Siemens, the noted German engineer, testified as to the introduction of the system in his own works, saying that it was all a matter of about a fortnight or three weeks. 'As far as I recollect it,' he added, 'the metrical system was very largely adopted throughout Germany between January 1, 1870, and January 1, 1872, during the optional period. It was very largely adopted then and was found to work so well that when the compulsory time came there was nobody to be compelled.' Another large manufacturer of steam engines and boilers, in testifying before the English Parliament committee which recently investigated the advisability of adopting the system, said:

"Before coming here this afternoon I asked four or five of our men privately (not through the works' manager) what they thought of the system which we adopted a short time ago. There was not a dissenting voice among them, and especially they all agreed at once that millimeters were very much easier to work to than the English measurements."

"I think the people of England are becoming thoroughly aroused to the necessity of changing their method of weights and measures, but they are extremely conservative and it may be years before the change is made. It will therefore be additionally to our advantage if we take the step first, and I think the adoption of the metric system by the United States would enable us to make great gains in our commercial standing in every quarter of the globe."

"I have provided in my bill that the new system shall not be formally adopted until January 1, 1901, in order to give ample time for such readjustment as may be necessary. My bill also stipulates that the system shall for the first year be compulsory upon the departments of the Government only and not until 1902 shall the weights and measures of the metric system be the legal standards. I do not doubt that in the space of one year during which the system is employed by the Government the people will become fully educated to its use and enthusiastic for its complete adoption."

"I have spoken so far only of the trade advantages to be secured, but there is a most important feature that should not be overlooked. The system is convenient and economical in practical use, and to the nation that appreciates so fully the advantages of the decimal system in its coinage and currency no argument or demonstration of the wisdom of transforming its weights and measures into a decimal system would seem necessary. The saving of time in the education of the young that would result from the change has been estimated with considerable unanimity by educators, but the saving in all the practical operations in subsequent every day life is beyond the possibility of intelligent estimate. The report of the committee of the English Parliament which recently investigated the question states that 'no less than one year's school time would be saved if the metrical system were taught in place of that now in use.' This is corroborated by the estimates of educators in this country some of whom concur in the English estimate of an entire year in the child's school life, while others limit it to the saving of a year in the time given to arithmetical instruction. Taking it on either basis and remembering that according to the reports of the Commission of Education there are in the public and private schools of this country more than 15,000,000 school children, the aggregate loss may well be said to be appalling. The opponents of the adoption of this system—if indeed any are now seriously opposed to it—will hardly care to assume the responsibility for the continuance of a condition of affairs in which 15,000,000 years of human life may be said to be needlessly wasted."

W. L. C.

The Hemingway Coking Process.

The progress of the solution of the problem of satisfactorily coking Western coal is particularly interesting at this time. The demand for coke is in excess of the production, and Western consumers at a distance from the established coke regions are in a chronic state of anxiety over the continued shortage. The successful production of a satisfactory quality of coke from Western coal could not have come more opportunely. Our readers are familiar with the general results in this line which have been accomplished by the Universal

adapted to the treatment of coal incapable of being coked by unimproved ovens.

This improvement primarily consists, as shown in Figs. 1 and 2, of the application to an oven, A, of a blast which is heated outside of the coking oven. As a convenient means of heating the blast a furnace, B, is employed, having an auxiliary arrangement of open brick work, C, better shown in Fig. 3. The brick work preserves equality in the temperature of the blast and is intended to be heated and maintained at as high a temperature as the blast driven through and in contact with the mass of burning fuel. The bed of coal in the heating furnace is as large and deep as the requirements

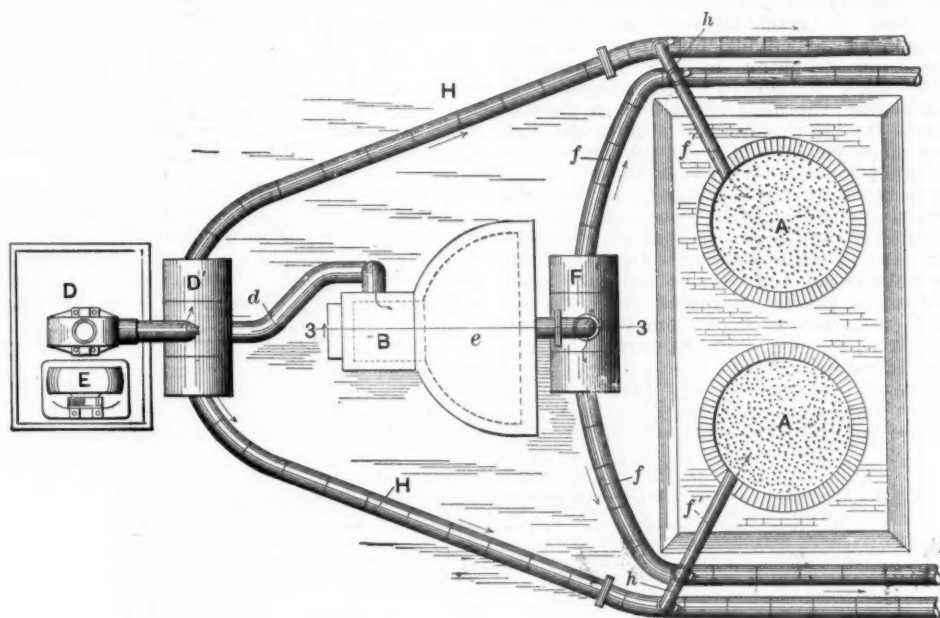


Fig. 1.—Plan View.

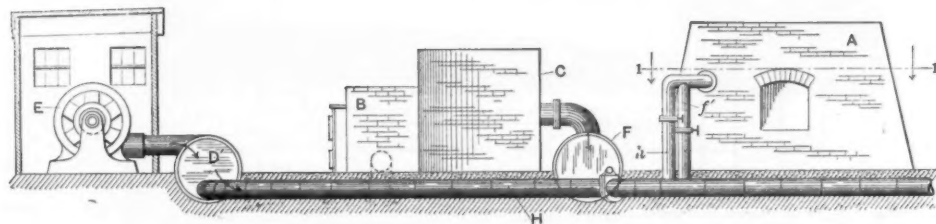


Fig. 2.—Side Elevation.

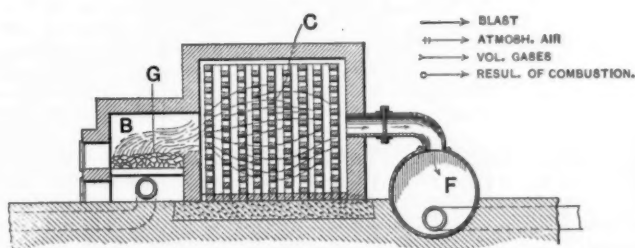


Fig. 3.—Vertical Section of Blast Heating Furnace.

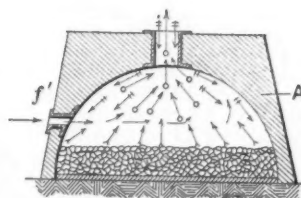


Fig. 4.—Vertical Section of Coking Oven, Showing Gas Circulation.

THE HEMINGWAY COKING OVEN.

Fuel Company of Chicago. They have demonstrated the practicability of their method of coking low-grade Western coal by such a long series of tests that capitalists are now sufficiently satisfied to employ the process as a commercial undertaking. The inventor of the process is Joseph Hemingway, who has had long experience in the coking of coal, and is connected with the company in the practical work of directing the use of his apparatus, which is herewith illustrated. A striking peculiarity of the Hemingway process is its adaptability to the beehive oven so generally used. In no way does it employ costly retorts nor require expensive changes in coke oven construction. It is simply an improvement on the ordinary beehive oven, producing better results than are now obtained from such ovens in the old established coke regions, but at the same time well

of the case render expedient or desirable. The blast is furnished by a fan, D, driven by a motor, E, operated by steam, electricity or other power. The air to be heated passes into a reservoir or accumulator, D', and thence through a pipe, d, through the heating furnace to a reservoir, F, from which it is conducted by pipes f and branch pipes, f', into the ovens, entering the ovens above the mass of coal confined and being coked therein, as shown in Fig. 4. This heated blast of air is to a great extent deprived of its free oxygen.

The action which then takes place is thus explained by the inventor: "The trunnel hole in the top of the oven is left open. The blast supplying a volume of incoming extraneous air and gas, in addition to the gases evolved from the coal, creates a movement or circulation in the oven above the coal which facilitates the discharge or

escape of the gases. This discharge naturally takes place in the direction of least resistance,—the open trunnel hole; but, as atmospheric air is heavier than heated air and always moves toward an area or spot of heated or rarefied air, the atmospheric air, containing free oxygen, forces its way down and into the oven through the open trunnel hole. Movement or circulation, therefore, in the dome of the oven while the trunnel hole is open conduces to two important contributory results—the egress upward and out through the trunnel hole of consumed or non-combustible or non-convertible gases and the ingress downward into the oven of a sufficient quantity of atmospheric air containing free oxygen to promote and support the necessary combustion, to secure accelerated coking."

An increase of temperature is thus secured in the coking oven, from 2000 to 3000 degrees above what is ordinarily employed in coking operations as generally practiced, and reaching in the Hemingway process a point often exceeding 4000 degrees F. This requires, of course, the most refractory or durable quality of fire brick for interior linings. Under the high temperature thus employed, the Hemingway process secures not only rapid generation and evolution of the gases contained in the coal, but a breaking up and disintegration of their elements and a conversion of the volatile carbons into a fixed form, so that they are deposited upon the coke in large quantities and form constituents of and substantial additions to the coke product. This explains the greatly increased yield of coke obtained by the Hemingway process from Connellsville and Pocahontas coals over the yield ordinarily obtained by the use of the common beehive oven.

The Hemingway process does not rely solely upon the addition of oxygen from atmospheric air admitted through the trunnel hole. It has been found that after

secured causes a rapid combustion of the combustible gases evolved from the coal, so that the coking operation is greatly accelerated. The rapid evolution and rapid consumption of gases enables the coking of a charge in many cases to be completed in half or even one-third the time ordinarily required in coking as now practiced. Care is required to shut off the supply of live air as soon as the combustible gases cease to be evolved from the coal, as otherwise the oxygen would burn the fixed carbon of the coal, thus reducing its quality.

The highly heated deoxygenized blast has proved of great value in accelerating the coking process in firing a

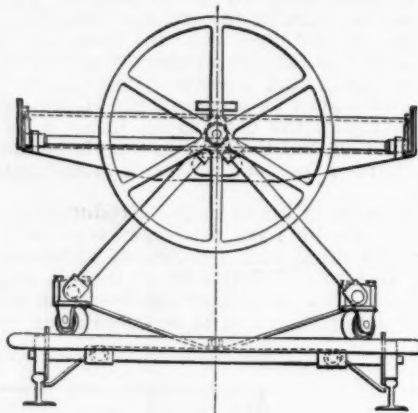


Fig. 2.—End Elevation.

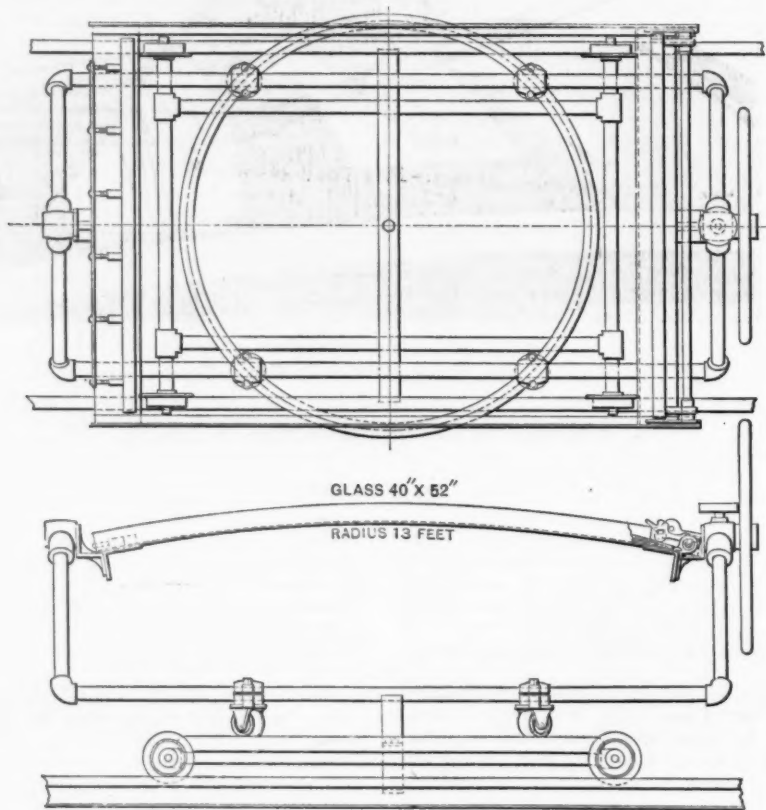


Fig. 1.—Plan and Side Elevation.

A CURVED GLASS BLUE PRINT MACHINE.

creating a temperature in the coking oven favorable to the rapid generation of the volatile gases in the coal, great acceleration of the coking operation may be obtained by shutting off the extraneously heated deoxygenized blast and following it up with a supply of live air containing free oxygen. Fig. 1 shows how the pipes are arranged for supplying such air. It is conducted through the pipes H which run from the reservoir or accumulator D' to the branch pipes f' entering the coking ovens. Valves or cut offs are arranged so as to enable either heated deoxygenized air or live air, or a mixture of both, to be blown into the coking ovens as desired. This supply of live air coming into the oven after the necessary and desired conditions of heat have been

new charge of coal after a charge of coke has been wetted down and drawn. Ordinarily two or three hours must elapse before the heat from the converging walls of the oven generates and ignites the combustible gases of the fresh charge. By the introduction of the highly heated blast into the oven above the coal, a temperature sufficient to cause the evolution and flaming of the gases is quickly secured, often within five minutes after the blast is turned on.

The Hemingway process covers the desulphurizing of coal by driving the hot blast through a layer of lime, G, spread on the bed of coal in the heating furnace. But it has been found in practice that the coal is desulphurized by the action of the highly heated oven without the

necessity of the use of lime or other desulphurizing material. A metallurgical coke, with less than half of 1 per cent. of sulphur, and in needles of a foot or more in length, is being produced from the screenings of an Indiana coal running $4\frac{1}{2}$ per cent. in sulphur at the company's ovens at Thirty-fourth and Iron streets, Chicago.

A gas plant is now being erected at the same place in connection with four testing ovens, for the purpose of saving the gas and other by-products from sample cars of coal sent to the company for a practical test of their coking qualities as well as richness in by-products. The whole process can then be witnessed by those interested in the coal. This gas plant was constructed by the Kerr Murray Mfg. Company, gas engineers, Fort Wayne, Ind., and is specially designed for the purpose. It is attached to the coking ovens at the tunnel hole and so arranged that at the proper time, after the gases are taken off, it can be detached for the purpose of permitting the completion of the coking process. Unlike other methods of utilizing coke oven by-products, the Hemingway process does not require the coke to be drawn after the gases have passed off, but the blast can again be applied to the oven to harden the coke in case a metallurgical coke is desired.

This process is about to be introduced in Iowa by a company controlling the process in that State, and now being incorporated with a capital of \$3,000,000, in which William Daggett, of Ottumwa, is largely interested, together with other prominent business men of the State. They are arranging to build as speedily as possible five

ured at \$30. If the plan as outlined is approved by the City Council, a large sum of money will be expended in installing water wheels, electrical equipment, cables, &c., estimated at over \$3,000,000.

A Curved Glass Blue Print Machine.*

BY PAUL MELLE CHAMBERLAIN.

The desirable features of a blue print machine are ease and rapidity of operation, such adjustment as to secure the direct rays of the sun, and means whereby close contact between the tracing and the sensitized paper may be secured. The machine here described and illustrated was designed to meet the above requirements, and was first built for and in the shops of the Lewis Institute.

The operation of the car and the universal adjustment is so clearly shown in Figs. 1 and 2 that explanation seems unnecessary. The iron work is all galvanized to avoid rusting after exposure to rain or snow. The glass is curved to a radius of 13 feet. Attached to one end of the frame is a sheet of canvas rubber packing about 1-32 inch thick. The other end of the rubber cloth is fastened to a steel tube which serves as a roller to roll the cloth on and also as a stretcher. Square projections at each end of the roller are engaged by hook cams which are operated by eccentrics on each end of

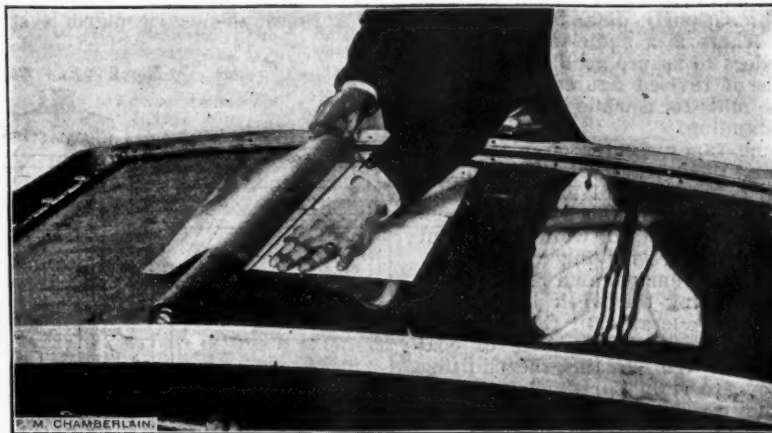


Fig. 3.—View Showing Method of Using Machine.

A CURVED GLASS BLUE PRINT MACHINE.

plants of 100 ovens each, located at Ottumwa, Des Moines, Council Bluffs, Davenport and Dubuque. All these plants will be equipped with by-product apparatus, to utilize the gas and ammoniacal liquor, and will produce both domestic and metallurgical coke. In Ottumwa and Des Moines the ovens will be built over coal mines within the city limits, and at the latter point important manufacturing enterprises are already projected, which will consume the gas.

The Utah Fuel Company, with a capital of \$1,000,000, and headquarters at Salt Lake City, will control that State. Walker Bros., bankers, are interested, together with Brigham Young and C. H. Kraft. They will shortly start a plant of 50 ovens at Cedar City, operating on a great deposit of lignite, near which are vast beds of iron ore, recently tested by Chicago chemists, and found to yield an average of 67 per cent. of metallic iron.

Negotiations for other States are under way. The policy to be pursued with respect to Indiana and Illinois has not yet been settled, but the company will shortly decide whether or not to issue licenses to enable the process to be used generally in those States on royalty.

The city of Chicago is arranging to purchase from the trustees of the Chicago Drainage Canal, merely another department of the city government, the right to use the horse power which can be developed from the canal at Lockport. The power is estimated at 20,000 horse-power at the wheel, or if 20 per cent. is lost in transmission of the power by wire to Chicago, it will be 16,000 horse-power as available at the point of use. The city will employ the power in pumping water and lighting the streets, displacing the present steam plants. The cost is to be \$4 per horse-power per year, which is much less than the cost of steam power, which is fig-

a steel rod, rotated by a handle at one end, through an angle of 180 degrees.

The operation is this: The rubber cloth is rolled back on the steel tube and the paper and tracing are placed on the convex side of the glass; the cloth is unrolled with one hand, leaving the other free to adjust or turn down crumpled edges of the tracing, as shown in Fig. 3; the ends of the steel roller are engaged by the cams, and a turn of the handle stretches the cloth, giving a pressure component normal to the glass; the frame is turned over, the car pushed out of the window and the frame adjusted to the proper angle with the sun's rays. The operation is rapid; the placing of tracings very easy and the contact obtained between tracing and paper all that could be desired.

Three years of use have demonstrated its convenience and durability.

The first 500-foot vessel built on the lakes will be launched at the yards of the American Shipbuilding Company, at Lorain, Ohio, on Saturday, January 20. It will be named for John W. Gates of Chicago, chairman of the American Steel & Wire Company, and Mrs. Gates will christen it. The new boat will be 478 feet keel, 52 feet beam and 30 feet deep, equipped with quadruple expansion engines. This is one of the four 500-foot vessels now building for the American Steamship Company, in which the officials of the American Steel & Wire Company are large stockholders.

The *Pictou Advocate* of Nova Scotia states that the Nova Scotia Steel Company have sold 200,000 tons of Newfoundland iron ore for shipment to the United States during the coming season.

* Abstract of paper presented at the New York meeting of the American Society of Mechanical Engineers.

Central Pennsylvania News.

HARRISBURG, Pa., January 15, 1900.—The iron and steel men of this district are still looking into each other's faces and there is an unspoken inquiry on every lip. They do not want to think that the summit has been reached—some of them don't—but they are much afraid that the top notch prices must take a drop to the normal level. It is freely admitted by those conservative masters of the trade who have looked with something akin to alarm at the rapidly advancing prices for several months that the reaction is what they have been hoping for, but even these do not want to see too sharp a decline. They prefer to see the situation right itself like a stanch ship after a hard blow, and most of them believe honestly that the readjustment of prices will not bring any disaster. It is expected that the diminishing prices will accompany a gradual resumption of normal conditions. But the cost of raw materials must go down with the price of the finished product. That is what is causing the present marking of time on the part of the iron and steel makers in this territory. They are not in a hurry to stock up with a great quantity of high priced iron when the tendency of prices is downward, and until this readjustment is completed, as it must be very soon, there is no reason to believe that the operations of the various plants in Central Pennsylvania will be brisk.

There are plenty of inquiries and many good orders have been booked, but until the situation is more nearly normal there will be a cloud of uncertainty and distrust. It is believed here that the dropping of prices to a reasonable basis would not seriously disturb the present prosperous conditions. There is a sufficient volume of business and enough orders to assure good times a long way ahead on the basis of revised figures. The thing that is going to upset the mills for a while is the bringing about of a good understanding.

There have been some fancy figures on plates and certain other products, and these will get back to normal prices. Then the plants will go ahead day and night. There does not seem to be any question about the condition of the market; there is plenty of work ahead, but consumers, as well as makers, are moving cautiously.

Several departments of the Pennsylvania Steel Works were partially suspended during the week just closed, but there was a more general operation of the extensive plant than the week previous. The shortage of coal continues to be a drawback, and explains the shutting down for a day or two of certain parts of the plant. The Bessemer department made a large output during the latter part of the week. The slab mill was kept moving steadily all week on slabs and blooms. The machine, bridge and construction departments have all they can do. The short coke supply interferes with the steady work of the blast furnaces.

The Standard Axle Works at Millersburg have declared a dividend of 6 per cent. The works are very busy.

Alexander J. Balfour of Philadelphia purchased at receiver's sale the property of Raymond & Campbell Mfg. Company at Middletown. He also purchased the machinery and materials, and it is understood that he will operate the plant on an extensive scale.

The American Tube & Iron Company's plant at Middletown is still closed, and the chances are that operations will not be resumed until February 1. The Harrisburg Rolling Mill, which supplies the tube works with a large quantity of skelp, is also running irregularly, but was in operation most of last week.

The Central Iron & Steel Company's mills have been seriously affected by the coal shortage. Several mills of the Susquehanna Iron & Steel Company at Columbia are also off. This is partially due to the fact that the company decline to furnish pipe iron to the National Tube Company for the figures quoted by the latter, and are therefore without a market for the skelp iron. It also explains the purpose of the Susquehanna Company to erect a pipe mill at Columbia.

The Harrisburg Mfg. & Boiler Company are running their plant day and night on heavy and pressing orders. There is a rush order now in hand for boilers and pipe for a water plant at Honolulu.

The Harrisburg Pipe Bending Company have sent a large shipment to Manila for a Government ice plant, to be erected in the capital of the Philippines.

During the year 1899 the collieries of Vancouver Island yielded 1,166,251 tons of coal, as against 1,117,915 tons in 1898. Of this there were exported 769,091 tons, as against 765,861 tons in 1898. Nearly all of the exports went to the United States. The tonnage going there is not stated, but the value given in the shipping returns is \$2,314,780.87 for the whole year 1899. There were shipments to the Hawaiian Islands and to Alaska.

The International Automatic Fire Sprinkler.

The International Sprinkler Company of Philadelphia, whose president is Clarke Merchant of Merchant & Co., are manufacturing and installing a new type of automatic pipe sprinklers, as shown by the engraving.

The links controlling the operation of the sprinklers are made of corrugated brass, the solder used in fastening them being prepared to withstand heat of different temperatures, normal being 165 degrees, medium hot rooms 286 degrees, excessively hot rooms (dry kilns, &c.), 400 degrees. These links have been tested under dead loads of 100 pounds and more without showing any signs of giving way, yet an ordinary match flame quickly melts the fastenings and brings the sprinkler into operation. The normal pressure on the links when the sprinklers are set up for service is 14 pounds. Each sprinkler is tested under a hydraulic pressure of 250, in order to make sure that they are perfectly tight.

When installing this system the sprinklers are placed an average distance of 8 to 10 feet apart, according to the construction of the building, open joist work requiring closer spacing. Under construction of this character sprinklers are "staggered" and so arranged that one sprinkler does not parallel the other; therefore, when in use the water is distributed over the entire area, instead of in spots or sections. When the sprinklers are in exposed places (near belting, &c.) they are furnished with guards to protect them from accidental injury. All exposed or outside pipes in connection with the International system are protected by tar paper and 1-inch felt covering, two thicknesses of each, and boxed.

A thorough electric alarm system is included in all



THE INTERNATIONAL AUTOMATIC FIRE SPRINKLER.

installations by this company, together with electric indicator for the roof tank, showing high and low water mark.

The eave sprinkler made by the company is designed for outdoor use exclusively, being arranged in such a way that when in operation the entire front of the building from roof to pavement is enveloped in a blanket of water. This sprinkler has no connection with the regular sprinkler system, being entirely independent of it. The valve used in connection with the dry pipe system has an anti-locking device which holds it open after operation and prevents the sealing of the valve through excessive back pressure. In the riser supplying sprinklers there is a priming connection to prime the valve. This is designed in such a manner as to permit the water column to be renewed if necessary without allowing the air to escape.

The following tests of the sprinkler were made upon open joist work construction in a room 15 x 16 feet: The first test was with five pounds' pressure, the entire floor surface being rapidly flooded, the overhead joist work and walls being also wet effectively. The strength of precipitation and area of distribution were greatly increased with additional water pressure. One thing brought out by the demonstration was the fact that while the sprinkler thoroughly covered the walls and floor, the ceiling was wet equally as well.

Before the Mining and Metallurgical Section of the Franklin Institute, J. F. Lynwood Garrison of Philadelphia has delivered a paper on "The Lead and Zinc Ores of Southwestern Missouri."

James Watson & Co. of Glasgow, Scotland, have issued their usual statistics of the pig iron trade of Scotland and of the east and west coasts of England. It is accompanied with a diagram showing the fluctuation in prices in 1899.

The Growing Necessity of Supplementing Water Power with Steam Plants.

Owing to the unusually protracted period of drought the water power streams, especially those in the Eastern portion of the country, have been reduced to a very low and inefficient stage. This has occasioned considerable apprehension among the manufacturers whose plants are dependent upon these streams for their power. In some instances it has already proved a source of trouble and annoyance, which is emphasized by the fact that this is a most busy period and that it is essential to operate the plants to their very limit in order to produce the materials required in consumptive channels.

Throughout the New England States, where water power is largely depended upon, the streams are almost dry. In these sections during a dry season water is prized more highly than the average manufacturer values his coal. In order to secure as much protection as possible against shortage during a dry season there are built, in connection with the general systems, what are known as "storm water dams." These dams are built up the river above the main dam and they create reservoirs which are drawn from when a shortage at the main dam necessitates it. These reservoirs or reserve supplies are now practically exhausted and the mill operator is looking toward the future for relief of some kind. As a rule, the melting of the early snow is looked forward to as relief prior to the spring showers. But it is now getting down toward the middle of January and the snow fall thus far has been of almost no practical consequence. It is felt that unless there will be some exceptionally heavy snow storms before the close of this winter or unusually heavy rains there will be a water famine next summer which will greatly hamper the mills throughout the year. During the months of December, January, February and a portion of March, when the ground is frozen, a very large percentage of the rain fall or snow melt goes directly into the streams, as the hard surface prevents absorption into the ground. During the spring and summer months this condition is reversed, and owing to the absorption into the earth very little of the water finds its way to the streams or toward the turbines or water wheels.

Thus it will be seen that, while the present supply of water is at its lowest stage, the shortage next summer will be enormous, provided there is no immediate relief.

Several manufacturers have already availed themselves of the precaution of installing auxiliary steam plants to the full capacity of their factories. In so doing they have been led to detect many losses which their water power systems incur and which they had not dreamed of before taking up the matter of steam power. The investigations have brought to light the fact that the loss of time caused by the failure in power at various dry periods amounts to no inconsiderable item. We are informed that a number of the largest users of water power are now investigating this matter, and there is much talk of putting in extensive steam plants in addition to the present water systems. It is claimed that, figuring the interest on the steam plants while idle, the ability to run the plants continuously, regardless of the water supply, more than compensates for the expenditure.

Interesting legal questions have also been raised lately in connection with the water power problem. The law allows the use of water for power purposes provided it is returned to the stream from which it is taken. It does not state, however, just when this water shall be returned. Several electric lighting concerns have taken advantage of this during the present dry season, much to the chagrin of the manufacturers "down the river." Their method is to dam the water and store it during the day, when their requirements are exceedingly light. At night, when their real work begins, they open up the dams and get the benefit of their day's storage. In this way they hold the water in check during the hours when the ordinary manufacturers need it for power and release it or put it back into the stream when most inopportune for the use of the manufacturers on the stream below them.

Charles A. Hague, consulting engineer, of 39 Cortlandt street, New York, has been dealing with problems of water power to a considerable extent of late and has encountered problems similar to those referred to. When interviewed on the subject he said:

"I have a case now on hand in which I was called in at first to survey the old dam and consider the feasibility of building a new one just below the old, as it seemed to be in a precarious condition. As the plant was operated exclusively by water power and as it would be necessary to shut down the mill during the period consumed in rebuilding the present dam, the idea of repairing the dam was out of the question. So a suitable place was selected and it was practically decided to build an entire new dam in addition to the old. The parties were willing to go ahead on this plan. But after looking over the ground it occurred to me that this was a first-class opportunity for the installation of a steam plant auxiliary to the hydraulic

plant. In talking this over with the general manager and the Board of Directors we discovered that they had lost much more time through low water and inefficiency of the service than they had ever before realized. After making preliminary plans it became evident that it would be a good move to put in a complete steam plant capable of carrying the full load. This being installed the old dam could be demolished and a new one built on the same site at a considerable saving of expense over the addition of an entirely new one. This would also give an opportunity for overhauling the water wheel outfit, which was sadly in need of alteration and repair and which sooner or later would have to be completely rebuilt. This would necessitate shutting down the plant during the busy and profitable season. This installation of the steam plant will go a long way toward relieving its owners of the anxiety of a dry season, and any trouble up the stream cannot affect the working of the mill. Under such conditions a steam plant also represents the sinews of war to the water power concern possessing it, placing them in a better position and condition for fighting for their water rights when they are made to feel that their factory may possibly lose time from annoyances caused by water power users further up the stream.

"Another case which presents several interesting problems is one in which the present dam is old and decrepit. The water this season is very low. In fact, it has been extremely low on numerous occasions during the last ten years, notably in 1895. In this instance the investment of a complete steam plant able to carry the necessary load would mean the outlay of many thousands of dollars. But even if the present dam should be thoroughly-replaced without the adding of a steam plant it is now apparent that storm dams will have to be built further up the stream in order to hold the water in reserve. The question is whether it would prove a better investment to build these storm dams or reservoirs or to install a steam plant. In either event the new dam would have to be built. The water storage system would entail the stoppage of the works for 90 days. This could be done by waiting until the present rush of business has subsided. These people have a large export trade which is very steady and uniform. Therefore if they decide to shut down they must stock up in order to hold their export business. The matter is now being considered and I think that after it is all boiled down they will decide that it is most economical to install the steam plant.

"Besides the point of economy it is evident that they can best cope with their work with a steam plant as an alternate to the hydraulic system.

"An automatic steam engine working in connection with the power furnishes very steady and perfect power for the reason that all attempt at fluctuation by the water wheel, as the demand for power varies, will be promptly met in a very natural manner by the steam engine. There are no doubt plants running to day exclusively by water power in which sudden calls for power slow down the water wheel for a few minutes, which often repeated makes a very considerable aggregate loss of speed and product in the mill or factory. This is precisely the gap which would be filled by an automatic steam engine of sufficient size to supply the balance of power.

"Present conditions existing both in the business situation and in sources of water supply indicate that many concerns now relying entirely on their water wheels will be forced to add steam plants to guard against a possible necessity of shutting down their works.

"The greatest trouble thus far has of course been experienced by manufacturers of paper. They have heretofore relied not only on water for power purposes but require so much of it in the process of manufacture."

The Rod Mill Strike.

The strike in the Cleveland wire rod mills of the American Steel & Wire Company, which began on Monday morning, affects only a portion of the rod mills of the company located in Cleveland. Two of the company's mills in that city—namely, the old Consolidated mill and the Morgan continuous mill—are still in operation. The strikers in the idle rod mills are not the head rollers, but the other workmen at the rolls. All the company's works in Cleveland, with the exception of the rod mills referred to, are running with full force, including wire mills, nail factories, galvanizing works, &c. The company expect to settle the trouble speedily, but if necessary they can send rods to Cleveland from their mills at Anderson, Ind., and Waukegan, Ill. The Waukegan mill is idle at present, awaiting the rebuilding of the finishing plant at that place destroyed by fire some time since. The company made a voluntary advance of 10 per cent. in the wages of all their workmen at the beginning of last year and 7½ per cent. at the beginning of this year. They also have made a handsome contribution to the benefit of their workmen by setting aside a sum equal to 2¼ per cent. of all wages for the relief of any of their employees who may be incapacitated from injury or other cause.

New Competitive Conditions in Steel Ship Building.

BY WALDON FAWCETT.

When the enlarged St. Lawrence canals are completed this spring, thus opening a water way for moderately deep draft vessels between the Great Lakes and the Atlantic Coast, new conditions will be formulated in the steel ship building industry of the United States. The effect, in substance, will be to give the coast builders on the one hand and the lake builders on the other competition in fields which each has heretofore held exclusively. It is practically certain, however, that the result of the new influences will be by no means similar in both instances, and in so far as can be judged in advance there is every likelihood that the steel ship builders of the Atlantic seaboard will lose far more than they will gain by the advent in the market of their energetic brethren whose plants are on fresh water.

By the utilization of the new channel any vessel which does not exceed approximately 260 feet in length and the draft of which is not in excess of 14 feet may pass with ease from salt to fresh water or *vice versa*. Within this scope there is included practically all of the smaller classes of craft, including passenger and freight steamers for coast service, tugs and steam yachts. Most important of all, however, is the fact that the lake shipbuilders will be admitted to the field of naval shipbuilding. This will not be the case immediately, because of certain provisions of the treaty negotiated with Great Britain in 1817, whereby the construction of war vessels on the Great Lakes was prohibited, but it will ultimately be true. Indeed Chairman T. E. Burton of the House Committee on Rivers and Harbors now has before Congress a bill looking to the abrogation of the clause of the treaty mentioned.

A consideration of the lake shipbuilders' prospects of securing an "open door" to naval work is of especial significance just at present, in view of the fact that any of the new gunboats designed especially for service in our new possessions, and the construction of which the present Congress is expected to authorize, could very readily be built on the inland seas. So also could torpedo boats, destroyers and dispatch boats. It may be noted in this connection that the Holland Submarine Torpedo Boat Company of New York seriously considered for a time the proposition to have one of their vessels constructed at a lake yard.

A comparison of the shipbuilding plants on the lakes with those of the coast is obviously difficult for many reasons. There is not, of course, on fresh water any plant approaching in magnitude those of the Newport News Shipbuilding & Dry Dock Company or the Wm. Cramp & Sons Ship & Engine Building Company, although in the matter of equipment the better class of yards on the lakes are, considering the amount invested, fully the equal of either of the yards mentioned. On the other hand the first-class yards on the lakes are unquestionably quite the equal of what might be called the secondary class of Atlantic Coast yards. They are, moreover, thoroughly up to date in practice. It was at the yard of the Chicago Shipbuilding Company that the practicability of pneumatic tools for ship construction was first conclusively demonstrated, and there might be cited other instances which bear equally strong evidence of their progressiveness. In short, to sum it up, the lake yards are likely to prove far more formidable competitors of the coast firms than any person not thoroughly conversant with the subject would imagine.

The tool and machinery manufacturers and the supply men generally constitute the one element who appear to be thoroughly enthusiastic over the new state of affairs. They argue that in order to keep their plants up to those of their competitors many of the coast builders will be compelled to purchase new equipment, whereas the lake builders, if the new opportunities bring additional business, will assuredly be obliged to make provision for increased capacity. Finally the material supply man is likely to be benefited in any event, from the fact that he reaps result from any increased consumption of material anywhere.

That this new competition is already an established fact is evidenced by the fact that the Craig Shipbuilding Company of Toledo, Ohio, have within the past few months constructed two steel steamers for the service of the New York & Porto Rico Steamship Company, who are represented by Miller, Bull & Knowlton of 32 Broadway, New York City. In addition they have lately closed a contract for a third steel vessel to be delivered on the Atlantic Coast in the spring, and there is an excellent prospect that the firm will also receive instructions to duplicate this latter vessel. This, it must be remembered, is but a beginning and is the record of but a single firm.

The vessel for which the Craig Company have just secured a contract from J. L. Crosthwaite of Buffalo and others is to be a steel vessel 258 feet in length over all, 48 feet beam and 18½ feet deep. Power for propulsion will be furnished by triple expansion engines, to which steam will be supplied from two Scotch boilers each 12½ feet in diameter and 12 feet in length. The steamer will be a single deck vessel and will be completed about the middle of July, when she will be taken to the Atlantic Coast at once and operated in the lumber trade between Atlantic ports. The second vessel for the same interest will be a duplicate of the one just described and there is a strong probability that the Craigs will build it. Bids have also been asked on a third steamer of a size to go through the canals, but the contract may not be closed for some months.

Very few of the steel ship builders on the Atlantic Coast, and indeed a number of those on the lakes as well, have any very clear conception of just what vessels will pass through the Welland and St. Lawrence canals. The Welland and St. Lawrence locks are identical in size and each is 270 feet in length from the miters of the gates and 45 feet wide, but this does not convey an adequate idea of the largest size of vessel which may lock through, as that is dependent upon the model of the bow and stern of the vessel. A vessel that is sharp forward at the deck line and narrow at the stern can lock several feet longer than one that is nearly full beam in the locks. The lock gates miter at an angle of 90 degrees and any designer or builder of a vessel can, of course, upon inspection of a drawing of a ship, tell at once whether or not she will lock through.

The largest vessels which have thus far locked through in safety range from 242 to 247 feet keel and 255 to 259 feet over all and from 36 to 43 feet beam. When a vessel is a close fit in length more or less delay is encountered in the operation of locking. It will thus readily be appreciated that the reason why a steamer of narrow beam can lock longer than one of greater beam, or nearly full width of the locks, is found in the fact that the vessel of less beam may be swung to one side of the lock and one gate opened and then to the other while the other gate is being opened. In a similar manner coming up through the canal the stern may be swung one way and then the other in order to permit of the gates being closed. As an illustration it may be stated that whereas a boat might lock 260 feet over all if only 33 feet beam, a vessel with the same type of hull could not lock over 255 feet if of 43 feet beam.

The adjustment of the new conditions which the opening of the canals will bring about is likely, the coast builders say, to be so much a matter of give and take that it is doubtful if either the coast or lake shipbuilders will in the end lose much by the new competition which will come into the field of each, and indeed with the certainty that the passage of the Hanna-Payne Subsidy bill would find the shipyards of America totally inadequate to cope with the demand for new ships it would not be surprising if both would be benefited materially. On the other hand the lake builders will probably be able to construct satisfactorily all classes of torpedo craft, and their ability as constructors of revenue cutters has been evidenced by the "Gresham," "Algonquin" and "Onondaga," which were taken to the coast during the Spanish-American war and have been retained there. On the other hand it is probable that certain coast yards will enter the field as serious competitors of the lake builders in the construction of steam yachts for service on fresh water. Moreover, the yards in these two shipbuilding districts will serve as a check upon each other should an effort be made to fix prices beyond a reasonable limit and as an outlet for new work should the plants in either district become overcrowded.

There are now in course of construction on the lakes several vessels especially designed to carry grain from points on Lake Superior to Montreal, where it will be transferred direct to ocean steamers, and it would not be surprising if vessels are ere long constructed to carry grain from northwestern ports to Liverpool without breaking bulk. Indeed it may be noted in passing that there is now building in a British yard a steel steamer designed for service between Canadian ports on the Great Lakes. In the matter of wages there is little difference between the lake and coast yards, and the advantage which one section possesses in the cost of one class of material is as a rule counterbalanced by additional freight charges on some other. The coast yards can unquestionably build successfully the smaller class of lake craft, but on the other hand the firms on the inland seas are there strong competitors in the construction of ocean going tugs. Indeed the most powerful sea going tug in the world was built at Cleveland and taken around by the coast—a journey of 4000 miles—to New Orleans, where it is now stationed.

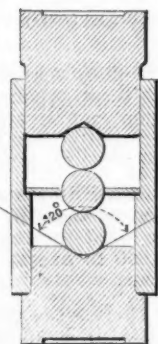
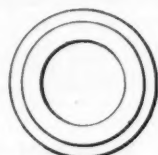
Steel ship builders on the Atlantic Coast may be interested in a brief description of the steamer "Mae," recently completed by the Craig Shipbuilding Company of

Toledo, Ohio, for the New York & Porto Rico Steamship Company of New York, inasmuch as she marks the initial product of the new competitive conditions. The owners could not secure satisfactory assurances of early delivery from any coast builder and consequently went to the lakes. The "Mae," which is now in active service between the ports of Ponce and New York, is a steel single screw steamer of 2100 gross tons or 1200 net tons burden. She is 263 feet in length over all, 42 feet beam and 25 feet depth, her speed being between 10 and 11 knots on a coal consumption of about 20 tons per 24 hours. Her mean draft when fully loaded is 19 feet, her dead weight capacity 3000 tons and cubic capacity 130,000 feet for cargo. She can provide storage for 350 tons of coal and is fitted with the most modern equipment, including steam steering gear and windlass, hoisting engines, &c. She is fitted with triple expansion, surface condensing engines, with cylinders of 22, 37 and 61 inches diameter and 36 inches stroke, to which steam is supplied from two Scotch boilers, each 12 x 12½ feet in size, working at 175 pounds pressure. The second steamer, the "Porto Rico," built for the same company and which has within the past few weeks been placed in the coasting trade around the island of Porto Rico, is 220 feet in length, 32 feet beam and 21 feet depth. She is designed for passenger, freight and mail service and has a speed of 13 knots.

Strength of Steel Balls.*

BY J. F. W. HARRIS, TERRE HAUTE, IND.

Reliable data of the actual breaking strength of steel balls not being obtainable, the following tests were made at the Rose Polytechnic Institute preliminary to the design of some ball bearings for experimental purposes. The balls were obtained in every case directly



METHOD OF ASCERTAINING STRENGTH OF STEEL BALLS

from the manufacturers, who are designated in the tests by the letters A to F.

The first experiments in crushing were made with the ball between two flat plates of a high grade tool steel, which had been hardened in brine. These proved unsatisfactory, the ball imbedding itself to a considerable depth. After trying several high grade steel plates of different brands with no better success, the method shown in Fig. 1 was adopted, in which the hardness of the balls was used to obtain a mutually unyielding surface. This apparatus consists of a steel cylinder bored to two diameters, with a square shoulder nearly midway of its height. Resting upon this shoulder is a thin steel plate, having a hole bored concentric with the cylinder, and whose diameter is 1-100 inch larger than that of the ball being tested. This plate serves as a guide for the central ball, retaining it in the axial line. Fitting snugly into the bottom of the cylinder is a hardened steel plug, having a conical recess in the center of its upper surface to retain the bottom ball. In the upper end of the cylinder is a similar plug, fitting loosely to allow its vertical movement under pressure without friction. After adjusting the balls, as shown in Fig. 1, this apparatus was placed between the heads of a 100,000 pound Riehle testing machine.

While making these tests of ball on ball, the search

was continued for a steel which would harden sufficiently to be used as ball races without injurious grooving under ordinary pressures. Several grades of various brands of tool steel, hardened in brine, were tried, their comparative hardness being ascertained by measuring the depression made by a ¼-inch ball under a load of 4000 pounds. These tests resulted in the selection of a steel known to the trade as crucible tool or file steel, and a special steel made by the Carpenter Steel Company, used by them in the manufacture of projectiles. All balls up to and including ½ inch in diameter were tested between two plates of Carpenter steel of 13-16 inch diameter and 1 inch in length. The indentations made were almost imperceptible, and were removed by grinding after each series of tests. The larger balls were tested between plates of crucible tool steel 2 inches square and ¾ inch thick, on which but slight indentations were produced.

The results obtained by both methods of testing are shown in the accompanying table of "Breaking Loads," in which the various tests are arranged in order of magnitude for better comparison, the numbers in the second column not having reference to order of test. The wide variations as shown therein arise principally from the difference in temper, which varied from brittle hard to that which could be filed with a Stubbs smooth file. The softest balls required the greatest pressure, and flattened until they finally split. Of this character are C₁ 15, A 25, B₁ 4, F₁ 15, E₁ 22, and F 15. The larger number of medium temper split in two pieces, the hardest broke up into a number of pieces.

In testing ball on ball, the center ball was broken in about 80 per cent. of the cases, the break occurring by the formation and forcing of a nearly conical wedge into the ball, the base of the cone being approximately circular. The angle of this wedge was about 60 degrees. When crushing between flat plates this wedge was formed in but very few cases, the balls generally breaking up into a number of pieces, the angle of the wedge in this case being about 75 degrees. Of the defects found in the balls other than those of temper, there are four cases of hollow center, A 13, F₁ 13, F₁ 16, and B₁ 4; and a few cases of fire crack, as A 26, B₁ 1, and F₁ 1 and F₁ 11.

Breaking Loads.

Diameter of ball.	No. of ball.	Ball on ball.					
		A	B	C	D	E	F
⅛ inch.....	1	800	760	1,360	940	870	1,020
	2	1,530	1,070	1,540	1,010	1,060	1,050
	3	2,240	1,150	2,120	1,680	1,210	1,240
	4	.....	.....	.....	.....	.....	1,620
Average.....	..	1,523	993	1,673	1,210	1,046	1,232
⅜ inch.....	5	2,360	2,000	2,200	1,250	1,640	2,160
	6	2,880	2,000	2,600	1,260	2,500	3,040
	7	2,900	2,230	2,780	1,480	3,180	3,150
	8	.....	2,580	.....	.....	.....	.....
Average.....	..	2,713	2,202	2,526	1,330	2,440	2,783
½ inch.....	9	3,860	3,600	3,770	2,600	4,200	4,330
	10	3,900	3,750	3,800	3,340	4,440	4,450
	11	4,430	4,000	5,020	4,000	5,330	4,800
	12	.....	5,300	.....	.....	.....	.....
Average.....	..	4,063	4,162	4,196	3,313	4,656	4,526
⅝ inch.....	13	*3,980	5,200	4,700	4,600	7,400	5,640
	14	5,380	5,240	5,100	6,200	7,530	7,730
	15	6,840	6,400	7,000	6,250	7,975	8,100
	16	.....	7,000	.....	.....	.....	.....
	17	.....	.....	.....	.....	.....	.....
	18	.....	.....	.....	.....	.....	.....
Average.....	..	6,110	5,960	5,600	5,683	7,635	7,156
¾ inch.....	19	7,050	5,850	8,400	6,700	6,200	11,800
	20	7,930	5,850	8,480	7,530	6,600	13,040
	21	8,550	5,900	9,230	7,640	8,000	15,090
	22	.....	7,200	.....	7,290	.....	.....
Average.....	..	7,843	6,200	8,703	11,200	6,933	13,310
1 inch.....	23	18,300	.....	17,450	11,840	10,180	.....
	24	21,600	.....	17,850	12,000	10,900	.....
	25	23,000	.....	18,400	11,680	12,740	.....
Average.....	..	20,966	.....	17,900	.....	11,273	.....
1 ¼ inch.....	26	*8,800	.....	.....	.....	11,800	.....
	27	17,750	.....	.....	.....	13,040	.....
	28	26,000	.....	.....	.....	16,100	.....
	29	26,800	.....	.....	.....	.....	.....
Average.....	..	23,516	.....	.....	.....	13,646	.....
1 ½ inch.....	30	56,400	.....	.....	.....	.....	.....
	31	58,600	.....	.....	.....	.....	.....
	32	62,100	.....	.....	.....	.....	.....
Average.....	..	59,033	.....	.....	.....	.....	.....
Diameter of ball.	No. of ball.	Between flat plates					
		A ₁	B ₁	C ₁	D	E ₁	F ₁
⅛ inch.....	1	1,600	*700	1,800	1,250	1,350	*1,000
	2	1,950	1,200	2,200	1,260	1,500	1,470
	3	3,800	2,150	2,300	1,434	1,600	1,600
	4	.....	2,200	.....	.....	.....	2,000
Average.....	..	2,450	1,850	2,100	1,313	1,483	1,690

*Abstract of paper presented at the New York meeting of the American Society of Mechanical Engineers.

$\frac{1}{8}$ inch.....	5	3,530	2,200	2,600	1,800	3,700	3,600
	6	3,980	3,500	2,900	2,100	4,400	3,600
	7	4,000	4,050	3,400	2,200	4,700	4,000
	8	.....	5,600	.....	2,900	4,800	4,350
Average.....		3,836	3,837	2,966	2,225	4,400	3,887
$\frac{1}{4}$ inch.....	9	6,700	4,600	4,900	5,400	5,600	6,300
	10	8,720	5,150	5,400	5,800	6,000	6,950
	11	10,580	6,200	6,400	6,900	6,850	7,600
	12	.....	6,900	.....	.....	6,900	8,200
Average.....		8,666	5,687	5,566	6,033	6,337	7,150
$\frac{3}{8}$ inch.....	13	8,480	6,000	9,300	7,000	8,500	9,500
	14	8,600	6,750	9,600	7,950	9,200	6,300
	15	9,900	7,400	13,600	8,250	9,300	7,200
	16	.....	7,400	.....	.....	10,100	9,900
	17	.....	.....	.....	.....	.....	13,600
	18	.....	.....	.....	.....	.....	13,700
Average.....		8,993	6,887	10,833	7,733	9,275	10,200
$\frac{1}{2}$ inch.....	19	10,700	10,800	10,500	8,700	9,700	9,800
	20	16,120	13,070	10,600	11,000	10,100	11,400
	21	18,000	14,250	10,650	11,800	12,000	13,000
	22	.....	18,050	.....	.....	19,400	19,150
Average.....		14,940	14,042	10,583	10,500	12,800	13,337
$\frac{5}{8}$ inch.....	23	37,000	.....	19,950	12,650	10,400	.....
	24	41,450	.....	20,600	15,300	12,900	.....
	25	46,860	.....	22,100	16,600	15,600	.....
Average.....		41,770	.....	20,883	14,833	12,966	.....
$\frac{3}{4}$ inch.....	26	35,900	.....	.....	.....	10,500	.....
	27	36,500	.....	.....	.....	20,000	.....
	28	44,200	.....	.....	.....	21,900	.....
	29	.....	.....	.....	.....	32,100	.....
Average.....		38,866	.....	.....	.....	21,125	.....
1 inch.....	30	88,700	.....	.....	.....	.....	.....
	31	92,600	.....	.....	.....	.....	.....
	32	.....	.....	.....	.....	.....	.....
Average.....		90,650	.....	.....	.....	.....	.....

* Visible defect (not included in averages).

Some experiments to determine the effect of the difference of area in contact on the breaking strength are being made, a few of which are given in the following table:

B ₁ Upper ball... $\frac{1}{8}$ "	6,700	2	3	4	5	6	7	8
B ₂ Center ball... $\frac{3}{8}$"	.....	5,400	6,300	.....	.....	6,000	.....	5,500
B ₂ Lower ball... $\frac{1}{2}$"	.....	.....	.....	.....	4,000	.....	5,650	.....
B ₃ Upper ball... $\frac{1}{4}$"	.....	9	10	11	12	.....	.....	.....
B ₃ Center ball... $\frac{3}{8}$"	.....	6,400	4,950	4,000	.....	.....	.....	.....
B ₃ Lower ball... $\frac{1}{2}$"	.....	.....	.....	.....	.....	.....	5,780	.....

THE WEEK.

A preliminary estimate of the mineral output of the State of Colorado made by the Denver Mining Exchange places its value at \$56,000,000, of which about \$35,000,000 was in gold, \$15,000,000 in silver, \$5,000,000 in lead and \$1,000,000 in copper.

The Board of Construction of the Navy Department have granted an extension of twelve months over the contract period for the completion of the 22 torpedo boats now building for the United States Navy. The action was based on a petition from seven ship-building firms in which it was stated that the steel makers could not possibly furnish the material for the new vessels in time to enable the contractors to complete them within the contract limitation of time.

The labor organizations connected with the Chicago building trades are taking steps to secure a general advance in wages April 1. The carpenters, who now receive 42½ cents an hour, have notified contractors that they will not work for less than 50 cents, which makes an advance of 60 cents for their working day of eight hours. The electrical mechanics name 25 cents per day as their expected advance. Other unions will follow the lead of the carpenters and electricians. It is believed that the contractors will comply with the demands made upon them.

The Senate Committee on Commerce, it is announced, will shortly take up the question of the establishment of a Department of Commerce, and will invite representative business organizations to present their views on the subject.

A bill extending until January 1, 1905, the time for the completion of the New York & Long Island Bridge Company's bridge across the East River between Manhattan and Long Island, was favorably reported this week to the United States Senate.

United States Consul Kennedy, at Para, Brazil, reports to the State Department that foreign manufacturers are using the names of established American manufacturing firms in the hardware and other lines on inferior goods sent to Brazil.

At the approaching session of the Quebec Legislature a bill is to be introduced, providing for a new corporation law modeled after the law which has proved so profitable to the New Jersey State treasury.

The total number of vessels of all descriptions that came into the port of New York during the year 1899 was 14,067, of which 9468 were American and 2407 were British.

Beerbohm's revised estimates of the world's wheat crop for 1899 gives a total of 2,513,200,000 bushels, against an average for the six years, 1894-1899, of 2,521,800,000 bushels. The estimate for 1899 is about 331,000,600 bushels less than for 1898.

John Brown & Co., Limited, recently launched from their shipyard at Clydebank, Scotland, the largest steam vessel ever built on the Clyde. The steamer, which is named the "Saxonia," is 600 feet long over all, 64½ feet beam, 49½ feet deep and 13,900 tons gross.

An international exposition on a large scale is to be held in 1901 in Sydney, Australia, "to celebrate the birth of the new century and the federation of Australia."

The Barber Asphalt Company of New York are reported to have purchased all the principal asphalt deposits in Mexico. The beds, which are located in the States of Vera Cruz and Tamaulipas, have been worked for several years in a small way.

D. A. Tompkins of Charlotte, N. C., the well known cotton expert, takes a very encouraging view of textile conditions in the South. There are now, he says, 5,000,000 spindles in the Southern States as against 13,000,000 in New England, and the number is likely to be increased to 7,000,000 by the end of this year. He does not believe that there is the slightest fear of overproduction if the market opportunities for American cotton goods are properly developed.

The Director of the United States Mint announces that the total coinage during 1899 was \$139,243,191, of which \$111,344,220 was in gold, \$26,061,519 in silver, and \$1,837,451 in nickels and copper.

Statistics tabulated by United States Appraiser Wakeman show that the value of foreign merchandise landed at the port of New York in 1899 was \$494,144,840, an increase of nearly \$84,000,000 over the previous year.

Unskilled labor is extremely scarce in Western Pennsylvania and the Central West. Agents have been scouring Eastern cities for men and several gangs of one or two hundred each have recently been brought into Pittsburgh.

The fire loss of the United States and Canada in December, 1899, is estimated by the *Journal of Commerce* at \$13,260,650, bringing the total for the year up to \$137,773,200, or over \$17,000,000 in excess of 1898, and \$26,500,000 above the 1897 loss.

During the past year there were received at the Kansas City stock yards 6,024,212 head of cattle and hogs, valued at \$120,706,600, an increase of \$9,066,600 over 1898. To handle these animals there are 11,800 persons employed in the local live stock and packing industries.

The New York State Canal Commission appointed by Governor Roosevelt have recommended two plans for the creation of a ship canal across the State between the Lakes and the Atlantic Ocean. One is to widen and deepen the existing canals and enlarge and improve the locks at an estimated cost of \$20,000,000. The other plan, which is the one most strongly favored by the Commission, is to widen and deepen the present canals and enlarge and improve the locks and dig about 81 miles of new canal between Syracuse and West Troy and carry the waterway around the cities of Rochester and Syracuse, at a cost of about \$60,000,000.

The German Emperor has created a new academical degree, that of "doctor of engineering." The first recipient of the new degree from the Charlottenburg Polytechnic will be Prince Henry of Prussia.

The flour output at Minneapolis, Minn., in 1899 was the largest on record, amounting to 14,291,780 barrels, against 14,232,595 barrels in 1898. In 1878 the production was only 940,000 barrels.

The International Association of Machinists are preparing for a general movement for a nine-hour working day to commence April 1.

The Manufacturers' Club of Indianapolis, Ind., is about to erect a building in which to house small factories, furnishing power for the same. The building will also contain lunch rooms and other conveniences for both men and women and will be provided with a roof garden.

The Iron Age

New York, Thursday, January 18, 1900.

DAVID WILLIAMS COMPANY,	-	-	-	-	-	PUBLISHERS.
CHARLES KIRCHHOFF,	-	-	-	-	-	EDITOR.
GEO. W. COPE,	-	-	-	-	-	ASSOCIATE EDITOR, CHICAGO.
RICHARD R. WILLIAMS,	-	-	-	-	-	HARDWARE EDITOR.
JOHN S. KING,	-	-	-	-	-	BUSINESS MANAGER.

The Smith Trade Alliance.

We may confess to some surprise that greater attention has not been given in this country to an article in the January number of the *Forum* than it appears to have attracted. From time to time we have observed in the English trade press ridicule or denunciation of the "Trade Alliance" system developed during recent years by E. J. Smith, who, we believe, hails from Birmingham, but there has never until now come under our notice a clear presentation of his aims, the means which he adopts, and the results which he has achieved. That he himself has done in the article to which we desire to call attention.

His plans spring from the same evils which have driven so many American manufacturers into a multitude of schemes with a final resort to the modern consolidation—the greatest of these evils being savage, unrestrained competition. But his system differs radically from any which have been attempted on this side of the ocean.

Mr. Smith starts with the conviction shared by the majority of our makers that untold mischief is done by ignorance of or indifference to carefully establishing the real cost of production. Mr. Smith's first step after getting the members of a trade together is to form a large and representative committee to assist in working out the cost of production of every article to be covered by the alliance. On the top of this cost a minimum profit must be charged. In some trades every individual member may charge any price he likes above that minimum, but he must show, whenever called upon to do so, that after making out his calculations of cost on association lines, the minimum margin of profit is provided for in his selling prices. In these lines the competition between manufacturers resolves itself into efforts to reduce the cost.

In several branches of manufacture Mr. Smith adopts uniform price-lists. In others a system of grading is adopted in allowing special privileges in the way of larger discounts off selling prices to those members who are handicapped in the race for equality. Finally he has provided in some cases for a system of compensation for any loss of trade caused by the association, but states that thus far it has never been claimed.

It is in this way that Mr. Smith endeavors to secure what he calls a living profit. With that he couples a plan to secure to labor a "living wage," and it is this "alliance" with labor which gives vitality to his scheme. He holds—and many will agree with him—that by preventing "imbecile underselling" he prevents labor troubles. He recognizes the trades union and forms an alliance between it and the associated manufacturers, the fundamental principle being that neither side will countenance any maker or workman who is not included in the agreement.

In forming the alliance wages and profits are taken as they are, then profits are fixed on a fair level, and as a separate item there is added to wages a bonus or bonuses upon wages; each bonus being a percentage of such additional profit on a scale which in England is accepted as

a fair proportion. A wages and conciliation board, consisting of an equal number on each side, is established, whose decisions must be loyally accepted.

Mr. Smith mentions the following conditions which attach to the alliance:

"1. The work people have a guarantee that existing wages shall never be reduced so long as the alliance lasts.

"2. Wages for new articles introduced after its formation may be settled on each works; but either side can call upon the board to fix them.

"3. The first bonus is also a fixture, as selling prices will not be reduced below the first level.

"4. Any further bonus can only be paid on any increased actual profit. Any change in selling prices caused by advance in the prices of material, and not carried beyond, is exempt from further bonus.

"5. All bonuses after the first are subject to a sliding scale whenever real profits are increased or decreased.

"6. No strike or lockout is permitted unless in defense of the alliance. Then it is supported by both sides, and the expenses are divided.

"7. In the event of any dispute to be referred to the board, workmen must accept employers' conditions and prices under protest. They cannot leave their employment or be discharged on account of the dispute; but the settlement must be retroactive, so that no injustice may be done.

"8. Each employer retains full control over his own works upon all matters but those pertaining to wages and bonus and conditions of labor. Workmen can be discharged for any other reason, and are themselves free to change their employment whenever they wish to do so.

"9. The workmen's union must supply a sufficient number of good work people, and the board decides as to the necessity or otherwise of bringing new men into the trade.

"10. No restriction is placed upon any one wishing to come into the trade, so long as he agrees to sell on the lines laid down by the association, and to comply with the rules that govern competitors."

Mr. Smith rather laboriously, it seems to us, attempts to prove that the interests of the consumer are safeguarded. We fancy, however, that the average purchaser would regard such an alliance as a very effective "hold up."

It has been urged, too, that such a compact for mutual benefit between men and makers might prove a dangerous one to the industry and the country, when the question arises of meeting competition of capital and labor, warring merrily, in other countries.

Mr. Smith states that there are now working under such alliances in England 500 manufacturers, employing some 30,000 work people and controlling \$250,000,000 in capital. The latter figure, however, seems to us to be a misprint, since this would mean an average capital per manufacturer of \$500,000, which cannot be the case in the trades which he enumerates.

It is reported that Mr. Smith is now engaged in writing a book on his methods, which certainly will merit attention. His scheme is one which may well bring prosperity to manufacturers and mechanics, and we can well understand that it might prove a difficult and costly undertaking to start an opposition against an alliance so entrenched, but what floods of denunciation it would discharge in this country from the press, the legislative halls and the platforms.

The building of steel rail mills is easily accomplished on paper. The tongue of report is busy with two great schemes of this kind, one at a point in Western Ontario, Canada, and the other at Great Falls, Mont., by the Great

Northern Railroad. So jubilant are some of the newspaper writers over this gossip that they are already figuring on the dire effects which such competition will have on the Carnegie and Federal Steel companies. It will be ample time to consider such a question when contracts are actually let for the buildings and machinery.

The Ambition of Modern Russia.

The intimation by the Czar that an early important increase in the Russian navy may be expected possesses all the more interest because of its coming after the practical completion, in that country, of one of the greatest undertakings in railway building that the world has seen. While it may be that military needs have figured in the planning of all the railways in Prussia, it can hardly be supposed that other considerations have not even more weight, at least in regard to the roads most recently constructed. The State railways of Russia were built primarily for military requirements, but their commercial requirements have long since outstripped in importance their use for army transportation. So the opening of the trans-Siberian road and the accompanying development of the vast extent of country which it traverses undoubtedly will lead to production on a larger scale, with a corresponding increase in traffic, regardless of any military uses. The result of all this will be an increased purchasing power of millions of people, and a widening of markets that must prove of interest far beyond the limits of Russia.

It is true that the building of a railway is not followed necessarily by successful operation, but it is worth noting that nowhere in the United States, in spite of the fact that more than once the building of railways has seemed overdone, has any road ever been laid down which it was found necessary later to abandon. On the contrary, the value of American railway property is greater than ever before, its physical condition in the aggregate is better, and the volume of earnings greater. A similar statement might be made regarding the railways of most other countries; and even in Africa lines built in sections which were practically without any traffic have proved so successful that extensions are constantly being projected. Hence it appears reasonable to expect, in a country so extensive and populous as Russia, with so large a traffic already developed, and with the people vigorous, industrious and frugal, that railway building may be followed in some localities by such improved conditions as resulted from extending railways across the prairies of western America.

There can be no doubt that the commercial development in Russia which appears in immediate or early prospect has helped to influence the new policy of naval expansion. Great nations do not, in these days, build costly war ships merely for the sake of owning them. They do require navies in order that they may be prepared at all times for war, but even then the feeling at the bottom is not a desire to own territory so much as to command the widest possible commercial opportunities. The ambition of modern Russia, therefore, is concerned with a prospective commerce more extensive than that country has yet been able to boast of, and the Government seeks to foster this commercial growth by affording such protection as can be assured in no other way so fully as by making Russia a more important sea power.

The new markets which will be opened by the Russian railways now in course of construction, together with the opening of certain new seaports which the Government is understood to have in prospect, cannot fail to interest the whole industrial world besides. The new development

requires material and technical knowledge which Russia, within the recent period since she ceased to oppose the introduction of Western ideas, has not become able to supply. From the first step in the building of railways in that country, not only American engineers but American materials have found an opening there. The recent determination of the Government to have all the railways in Russia equipped with certain safety appliances is coupled with the requirement that they shall actually be manufactured within the empire. But there happens to be presented an opportunity for American capital and American equipment for the manufacture of the devices which have been adopted. Likewise the increase in the navy points to the possibility of orders for ships reaching the United States, in addition to what have been placed here already, and if the shipbuilders of this country are capable of building war vessels for such a power as Russia—careful that every requirement shall be met fully—they should be no less able to build anything in the way of merchant ships that Russia is likely to call for.

The references made above to American trade with Russia bear chiefly upon classes of goods which may be said to sell themselves. If a demand exists there for steel rails, it exists without regard to any efforts made from the outside to secure trade, and to obtain such orders Americans have only to be in a position to fill them promptly, at prices at least as low as those of competing countries. So with the building of ships. With regard to the sale of machinery, we may be producing something which is desired in Russia and which is not obtainable outside of the United States. But all of these are lines in which trade in large volume cannot be expected to be constant or permanent; once an equipment is completed, further requirements in that quarter will be confined to making up for depreciation. The backbone of foreign trade with Russia must be in the supplying of minor articles—such as can enter into wide use or consumption, at prices within the reach of great numbers of people. These articles, including many of iron and steel, must be carried to the people, instead of the manufacturers waiting for orders to come to them. Russia will try to build her own ships in time, but the manufacture of the thousand and one articles of utility or convenience may long delay taking root in that country—either because the Government does not foster such manufactures as in the case of larger interests, or because the people as a race do not lend themselves readily to the production of such goods, or because, by reason of their industries having been longer established, outside countries may be able to make them at an advantage as to price. At any rate, the possibility not only exists, but seems likely to become greater, for selling very many kinds of foreign made goods in Russia. The yearly fair still maintained at Nijni Novgorod is a relic of the time when goods from Western Europe were carried into Russia by means of caravans, just as trade was conducted between the same countries and India and China. The building of railways makes access to Russian markets easier, as well as opening the way to a larger purchasing power of the people. Within a few years have been seen at one and the same time Russians starving in one province and grain rotting in the fields in another, for the lack of means of transportation. Such lack will not longer exist, and the merchants of that nationality which is first to gain a strong footing in the new markets now opening may long enjoy an advantage from it. It is for this reason that it seems desirable for more Americans to devote serious attention to Russian trade than have done so in the past.

The Engineers' Society of Western Pennsylvania will hold their annual banquet at the Hotel Schenley, in Pittsburgh, on Thursday evening, February 8.

The New York Rapid Transit Tunnel.

John B. McDonald was awarded the contract for building the New York Rapid Transit tunnel. His bid was to build and equip the railroad for \$35,000,000. This price includes the entire four sections, thus indicating that the work will be performed at once and in its entirety. The bidder also agrees to operate the road for the upset price, a statutory requirement of interest equal to that paid by the city for the bonds, and 1 per cent. additional. According to the contract ground must be broken within 30 days of the awarding of the contract. Mr. McDonald stated: "I shall be ready to begin work within 30 days after the award, and can have operations in Elm street and in Harlem under way at the same time. The plans and specifications are made out and I believe the tunnel can be built in three years. The work under my charge shall be distributed among contractors, each section according to the skill and ability of the contractor." He also stated that there would be about \$10,000,000 worth of iron work.

The bid of John B. McDonald for the tunnel by sections was: Section 1, \$15,000,000; sections 1 and 2, \$26,000,000; sections 1, 2 and 3, \$32,000,000, or the four sections, \$35,000,000.

Mr. McDonald offered to furnish the \$1,000,000 cash deposit required in the contract. This he must do within ten days of the awarding of the contract. The following sureties were named for the \$1,000,000 and \$5,000,000 construction and continuing bonds: The Fidelity & Deposit Company of Maryland, the United States Fidelity & Guarantee Company and the American Surety Company of New York.

Associated with Mr. McDonald are said to be John F. Carroll, leader of Tammany Hall in Richard Croker's absence; Andrew Freedman, whose surety company furnishes part of the bonds, and Daniel F. McMahon, chairman of the Tammany Executive Committee. Mr. McDonald is himself a member of the Finance Committee of Tammany Hall. It has also been stated that he represents the Whitney or Metropolitan Traction Syndicate. Mr. McDonald is now building the Jerome Park, New York, reservoir. He built the Baltimore & Ohio tunnel in Baltimore and also the West Shore road.

There was but one other bid received. It was from Andrew Onderdonk of 80 Broadway, New York. The price named in this bid was \$39,300,000. The terms of his bid were: For the first section, if the road shall consist of only one section, \$17,000,000; for the first and second sections, if only two are to be built, \$28,000,000; for the first, second and third, \$35,500,000, and for the four sections, \$39,300,000. Mr. Onderdonk agrees to pay to the city of the gross receipts over \$5,000,000 5 per cent. on the first \$1,000,000 and 2½ per cent. additional on each succeeding \$1,000,000, but not exceeding a maximum of 15 per cent. after five years. He names as sureties for the \$5,000,000 contractor's bond the Fidelity & Deposit Company of Maryland, the United States Fidelity & Guarantee Company, Samuel Shortridge, Frank E. Randal and Nathaniel Havens. He offers as security for the \$1,000,000 continuing bond 1000 shares of Southern Railway East Tennessee reorganization mortgage bonds, bearing interest at the rate of 5 per cent.

An informal bid presented jointly by the United Contracting Company, the Metropolis Constructing Company and the Terminal Railroad & Construction Company was refused.

A résumé of the contract and description of route and materials required are printed in *The Iron Age* under date of October 19, 1899.

The Alabama Steel & Wire Company.

(By Telegraph.)

BIRMINGHAM, ALA., January 17, 1900.—At the meeting of the stockholders of the Alabama Steel & Wire Company, held yesterday, James Bowron was elected a director to succeed C. E. Robinson. E. T. Schuler was elected president and G. H. Schuler, secretary and treasurer. These three constitute the Board of Directors. Part of the works will commence operations about February 1.

The Tin Plate Wages.

(By Telegraph.)

PITTSBURGH, PA., January 17, 1900.—The bi-monthly conference between Wage committees of the Amalgamated Association and the American Tin Plate Company will be held in Chicago, Friday, January 19, to fix a wage scale in tin mills for January and February. The men expect an advance of about 8 per cent.

The National Steel Company.

(By Telegraph.)

PITTSBURGH, PA., January 17, 1900.—On January 1, 1900, the National Steel Company secured control of the blast furnaces, Steel works and rolling mills of the Aetna-Standard Iron & Steel Company at Mingo Junction and Bridgeport, Ohio, and will hereafter operate them as the Aetna-Standard works. The Aetna-Standard Iron & Steel Company continue their corporate existence with John A. Topping, president, and Isaac M. Scott, secretary and treasurer, and will carry out all contracts or other obligations that they may have outstanding. The financial operations and accounting will be directed by the general offices of the National Steel Company, and all remittances or settlements of accounts should be made through National Steel Company, Marquette Building, Chicago.

In this connection we note also the fact that B. M. Caldwell, formerly vice-president and general manager of the Aetna-Standard Iron & Steel Company, has severed his connection with that concern, at his own request, in order to devote more time to his personal affairs. He will not, for the time being, engage actively in any other business, but will be absent for a number of months on a Southern cruise.

The position of vice-president and general manager has been abandoned, John A. Topping, manager of Aetna-Standard Works, National Steel Company, assuming the general management of both the operating and commercial departments. The retirement of Mr. Caldwell from this concern was sincerely regretted by his associates, who endeavored to persuade him to continue with the concern, but without avail. Mr. Caldwell retires with the very kindest feeling existing between himself and his former associates.

The American Tin Plate Company.

At the regular annual meeting of the stockholders of the American Tin Plate Company, held last Tuesday, a clause was inserted in the by laws of the company requiring the officers to make a full financial statement of assets and liabilities which should truly disclose the character and location of each. It was also decided to hold open for the inspection of the stockholders the complete list of stockholders, showing the names and addresses and number of shares of either common or preferred stock held. This list shows that there are more than 1500 stockholders and that there is no control of the stock in the Board of Directors.

The annual report filed in the State of New York shows the following:

The amount of their capital stock, and the amount authorized to be issued, is	\$50,000,000.00
The proportion actually issued is	46,325,000.00
The amount of their debts does not exceed the sum of	1,226,238.00
The amount of their assets is at least the sum of	7,460,167.00

The annual statement, which is dated December 31, 1899, shows the following:

ASSETS.	
Plants, real estate, patents, machinery, &c.	\$43,404,508.04
Merchandise, inventory	4,951,925.40
Accounts receivable	1,518,247.35
Cash	988,984.34
Total assets	\$50,864,665.13
LIABILITIES.	
Capital stock, preferred	\$18,325,000.00
Capital stock, common	28,000,000.00
Total capital stock	\$46,325,000.00
Purchase money mortgages, assumed	270,000.00
Accounts payable	1,656,238.98
Surplus	2,613,426.15
Total liabilities	\$50,864,665.13

The following officers were re-elected: President, D. G. Reid; first vice-president, William B. Leeds; second vice-president, William T. Graham; third vice president, Warner Arms; treasurer, F. S. Wheeler; secretary and treasurer, E. G. Applegate; assistant secretary, H. B. Wheeler; counsel, James B. Dill. Messrs. Reid, Quay and Mathews were re-elected to the Board of Directors for a term of five years.

We can state officially that the only order so far received by the Pressed Steel Car Company, Pittsburgh, for steel cars for shipment to France is one for 500 cars.

MANUFACTURING.

Iron and Steel.

The employees of the Sharon works of the National Steel Company, at Sharon, Pa., have been given an advance of 10 per cent. in wages.

The Newark Weldless Tube Steel Company of Newark, Ohio, held their annual meeting last week and elected the following directors: J. W. Lee, S. V. Bishop, T. B. Moreland, H. J. Bock, J. R. Goldsborough, all of Pittsburgh, and W. E. Miller, J. M. Schwartz, Joseph H. Newton and Samuel Morris of Newark. The election of officers resulted as follows: W. E. Miller, president; S. V. Bishop, vice-president; J. R. Goldsborough, secretary-treasurer and general manager.

The capital stock of the Sharon Steel Company, Sharon, Pa., is to be increased from \$3,000,000 to \$4,000,000. This concern will build an open hearth steel plant, blast furnaces and rod mill at Sharon, and it is reported the addition of \$1,000,000 is for the purpose of building a tin plate plant.

A meeting of the stockholders of the Hussey-Truxall Steel Company will be held in their office in Pittsburgh, on Friday, January 19, for the purpose of voting on a proposition to issue preferred stock of the company to the amount of \$50,000.

The Ohio Iron & Steel Company, operating Mary Furnace at Lowellville, Ohio, have increased their capital stock of \$150,000 to \$500,000, that it might represent more nearly the value of the plant with surplus.

The Peru Steel Casting Company of Peru, Ind., have made an increase of \$250,000 to their capital stock, the entire stock now being \$650,000.

Machinery.

When the plans of the Westinghouse Electric & Mfg. Company are fully carried out at their plant at East Pittsburgh, that concern will have one of the largest manufacturing buildings in the world. The plans, which are now on exhibition in the Westinghouse Building, Pittsburgh, show that the new structure will be more than 1200 feet square, and with an average height of three stories. The contract for the erection of a portion of this structure will be let within two weeks. The building contemplates additions to the present structures, giving a total floor space of more than 4,500,000 square feet. The first improvement to be made will be an addition to the machine shop and warehouse, extending 176 feet north of the present warehouse and 52 feet south, the latter end connecting with the power house. When these additions are completed the factory building will then extend 1250 feet on each of the four sides, enclosing a court that is 400 x 1000 feet. Two switches are to be built from the Pennsylvania Railroad to the enclosed court, and all the manufactured product of the mill will be erected and prepared for shipment in this department. When the new buildings are completed the working force of the concern will also be increased fully 500 men. Other changes are contemplated, which will increase the capacity of the plant at least one-half.

The Braddock Machine & Mfg. Company, recently organized at Braddock, Pa., for the purpose of manufacturing machine tools, air compressors and other kinds of machinery, have placed several contracts for the erection of their new works, which will be located at Braddock. The buildings will be constructed by the Pittsburgh Bridge Company, and will consist of a main building, 60 x 360 feet, a second similar building, 80 x 200 feet and a third, 30 x 200 feet. The contract for the traveling cranes have been given to the Monongahela Machine Tool Company of Pittsburgh; a 10-ton hand power crane will be furnished by the Reading Crane & Hoist Works, Reading, Pa. The Whiting Foundry Equipment Company, Harvey, Ill., will furnish a large cupola and five ladies. The power for operating the new works will be generated by gas engines, and all machinery will be driven by electricity. The contract for the machine tool equipment has been given to the Monongahela Machine Tool Company. The new concern, in addition to the lines mentioned above, will also manufacture a compound air compressor of new design.

The Keystone Driller Company of Beaver Falls, Pa., have sold a machine to the Oliver Iron Mining Company for locating and proving up iron ore deposits on Minnesota lands.

The Pittsburgh Steam Steering & Mfg. Company of Pittsburgh, Pa., have been incorporated with a capital of \$300,000. The concern propose to manufacture steam steering apparatus.

The Standard Foundry Company, which purchased some time ago the idle foundry of the American Foundry Company, Cleveland, Ohio, will operate it to full capacity this year, and will considerably increase the output.

In the courts at Pittsburgh a petition has been filed, asking for the dissolution of the Leechburg Foundry & Machine Company, who have been absorbed by the Mesta Machine Company. There is \$200,000 to distribute among stockholders. The preliminary order was made.

The new Empire Building, being erected at Fifth and Liberty streets, Pittsburgh, will contain two Scaife water filters, having a combined capacity of 3500 gallons per hour. The arrangement contains a unique feature; being designed so that either filter can be shut off from the main supply pipe while be-

ing cleansed: the other filter meanwhile furnishing the filtered water for the entire building. William B. Scaife & Sons are the manufacturers of these filters, which contain no chemicals or coagulant of any description. William B. Scaife & Sons have been awarded the contract for building the extensions to the Canton Steel Company plant. The specifications consist of a great amount of plate girder work and steel frame construction.

The Portage Lake Machine Works, at Ripley, Mich., near Houghton, lost their foundry, pattern shop, office and a warehouse by fire on the 11th inst., causing a loss of \$85,000, with \$40,000 insurance. The machine shop was saved.

The foundry and machine shops of F. M. Davis Iron Works Company, Denver, Col., were totally destroyed by fire on January 10, involving a loss of about \$150,000.

The Warren City Boiler Works, Warren, Ohio, are building for the city of Norfolk, Va., two large stand pipes, 10 x 150 feet, and 25 x 100 feet. They have a large number of orders for this kind of work booked for the coming season.

The Cincinnati Planer Company, Cincinnati, Ohio, held their first annual meeting on the 15th inst., having just completed their first full year, and the report of their business may be told in kind by nearly every machine tool building concern in the Queen City, for all of them have enjoyed an exceedingly prosperous year's business. The concern named have shown that their earnings upon the capital invested have been 45 per cent. for the 12 months just ended, all of which, however, will be converted into betterments by the purchase of additional ground space, and the erection and equipment of additional buildings thereon.

The Acme Foundry Company of Cleveland, Ohio, have been incorporated, with a capital of \$30,000, to manufacture gray iron castings. The incorporators are L. G. Kranz, C. K. Sunshine, Wm. Jassland, Wm. Greenbaum and B. A. Spayne.

Hardware.

Codding Mfg. Company, Bristol, Conn., manufacturers of floor and ceiling plates for plumbers and fitters, are building a new foundry, 45 x 62 feet, with an L, 13 x 22 feet, equipped with modern appliances, and with a capacity somewhat greater than is required for their own castings. The new foundry is expected to be in operation during February.

Wilcox, Crittenden & Co., manufacturers of marine hardware, Middletown, Conn., are now equipping their plant with electricity for lighting and power purposes. Heretofore water and steam combined have been their motive power. They are installing a generator of about 150 horse-power, which will furnish power and light for their whole plant. The change in power has been made for economy as well as convenience.

The Louisville Bolt & Iron Company have purchased the plant of the Anderson Iron & Bolt Company, Anderson, Ind., and will remove machinery, &c., about February 15 next to Louisville, Ky., where they are now building a modern plant, which will have double the capacity of the one at Anderson. The works at Anderson will be kept in full operation until the company are ready to operate at Louisville. Until the change is made the company request the trade to address them at Anderson, under the name of the Louisville Bolt & Iron Company. The products of the company include common carriage bolts, machine bolts, bolt ends, bridge and truss rods, lag screws, plain point and gimlet point coach screws.

The Gurney Refrigerator Company, Fond du Lac, Wis., shipped a carload of refrigerators on the 11th inst., destined for Honolulu.

Thirteen hundred employees of the Pratt & Letchworth Company and the United Hame Company, Buffalo, N. Y., with their wives and friends, making a total number of about 2000, on New Year's Day, after inspecting the new electric power department, partook of a bountiful luncheon at the company's warehouse, which was effectively decorated. In the evening a grand ball took place.

The New Castle Shovel Company, New Castle, Pa., manufacturers of shovels, spades and scoops, are at present furnishing large quantities of their product. The Cleveland or Hollow Back line of shovels to the trade, and report that the same are giving the best of satisfaction, in view of their excellent finish and quality.

Miscellaneous.

The Ohio River Roofing & Mfg. Company of Belle Center, Ohio, have been incorporated with a capital of \$100,000. The company will engage in the manufacture of steel roofing, spouting, galvanized tanks and sheet metals.

The Berkshire Iron Yard, M. H. Rogers, owner, Bridgeport, Conn., dealers in scrap iron and metal, are at present dismantling several large plants in Bridgeport, among which are the Chequette Power Company, Bridgeport Copper Company and the Utilization Company. The material from these plants will aggregate about 2600 tons.

Information Wanted.—Who produces machinery for manufacturing binder twine? The address is also wanted of producer of machinery for making brooms by steam power.

The Iron and Metal Trades.

It has been apparent again that large buyers of undoubted standing have been able to pick up bargains in Foundry Iron. In such cases a number of sellers have sought the opportunity, which is equivalent to guaranteeing their profit. While it may be argued that this is a sign of weakness, it is true on the other side that such concessions as have been made would not tempt experienced buyers unless they recognized the inherent strength of the situation. It is worthy of note that purchases of this character have been made by melters who are covered far into the second half of the year.

The fact is that men possessing long familiarity with the Iron trade appreciate the fact that Iron production is proceeding under a tremendous strain, and that any weak link destroys the integrity of the whole chain. The Coke scarcity has been the chief specter. Although there seems little danger that we shall undergo the experiences of Iron makers on the Continent of Europe and in England, still the danger of temporary, annoying shortage is pretty close upon us. A blizzard might disorganize the industry for weeks. In the Eastern markets there has been quite a movement in Basic Pig lately.

Bessemer Pig in the Central West is quiet. The Valley Association has lately decided to take care of the sales of Mill Irons also.

The Steel situation is still undefined. The largest transaction during the week seems to have been the purchase of 10,000 tons of Steel by a mill in the Philadelphia district from a Pittsburgh Steel maker. Reports have been current that one of the largest consumers has bought a large block of Billets. We understand that while conferences have taken place, no sale has been effected. The large makers continue to hold on the basis of \$35 at Western mill, but that price is being shaded by others, and \$34 is closer to the market.

Reports come from the West to the effect that further Steel Rail orders of some magnitude have been placed, among them being one lot of 50,000 tons for export. It may be of interest to note in this connection that a new maker has appeared in the market, the Ohio plant of the National Steel Company having recently solicited Rail business.

The railroads seem to be buying Bridge Material quite heavily. Chicago reports the closing of one contract for about 3000 tons, with another for 8000 tons pending. In the East the 13,000-ton order for the New York Central road will probably be closed this week.

The tonnage for the New York Rapid Transit tunnel, of course, is very large, probably close to 60,000 tons, but it will be extended over a number of years. The work will necessarily be distributed among several mills. So far as we can learn, the material is not yet covered, wholly or in part.

It appears that some of the large interests are making sacrifices to hold a good share of the export trade. Our German correspondent refers in his letter to the disturbing effects upon the German Wire interests of the competition from American sources.

A Comparison of Prices

At date, one week, one month and one year previous.

Advances Over the Previous Month in Heavy Type.
Declines in Italics.

	Jan. 17, 1900.	Jan. 10, 1900.	Dec. 20, 1899.	Jan. 18, 1899.
FIG IRON:				
Foundry Pig, No. 2, Standard, Philadelphia.....	\$22.75	23.00	23.25	\$11.50
Foundry Pig, No. 2, Southern, Cincinnati.....	20.25	20.25	20.50	10.25
Foundry Pig, No. 2, Local, Chicago.....	23.50	23.50	23.50	11.00
Bessemer Pig, Pittsburgh.....	24.90	24.90	24.90	10.90
Gray Forge, Pittsburgh.....	21.25	21.25	20.50	9.75
Lake Superior Charcoal, Chicago.....	25.50	25.50	25.50	11.50
BILLETS, RAILS, ETC.:				
Steel Billets, Pittsburgh.....	34.00	35.00	34.00	16.50
Steel Billets, Philadelphia.....	37.00	37.50	nom	19.50
Steel Billets, Chicago.....	nom	38.00	nom	18.50
Wire Rods, Pittsburgh.....	nom	nom	nom	24.00
Steel Rails, Heavy, Eastern Mill.....	35.00	35.00	35.00	18.50
Spikes, Tidewater.....	2.65	2.65	2.65	1.45
Splice Bars, Tidewater.....	2.30	2.30	2.35	1.10
OLD MATERIAL:				
O. Steel Rails, Chicago.....	18.00	18.00	20.00	8.00
O. Steel Rails, Philadelphia.....	21.50	20.00	22.00	11.25
O. Iron Rails, Chicago.....	25.00	25.00	26.00	13.00
O. Iron Rails, Philadelphia.....	26.00	26.00	27.00	13.25
O. Car Wheels, Chicago.....	21.00	21.00	21.00	12.00
O. Car Wheels, Philadelphia.....	20.50	20.50	21.00	10.50
Heavy Steel Scrap, Chicago.....	18.00	18.00	18.00	7.75
FINISHED IRON AND STEEL:				
Refined Iron Bars, Philadelphia.....	2.20	2.20	2.20	1.15
Common Iron Bars, Youngstown.....	2.15	2.15	2.10	1.00
Steel Bars, Tidewater.....	2.40	2.40	2.40	1.15
Steel Bars, Pittsburgh.....	2.25	2.25	2.20	1.05
Tank Plates, Tidewater.....	2.40	2.40	2.50	1.35
Tank Plates, Pittsburgh.....	2.20	2.25	2.25	1.30
Beams, Tidewater.....	2.40	2.40	2.40	1.40
Beams, Pittsburgh.....	2.25	2.25	2.25	1.30
Angles, Tidewater.....	2.40	2.40	2.40	1.30
Angles, Pittsburgh.....	2.25	2.25	2.25	1.20
Skelp, Grooved Iron, Pittsburgh.....	2.05	2.10	1.95	1.10
Skelp, Sheared Iron, Pittsburgh.....	2.35	2.35	2.35	1.25
Sheets, No. 27, Chicago.....	3.00	3.00	3.00	2.00
Sheets, No. 27, Pittsburgh.....	2.85	2.80	2.80	1.85
Barb Wire, f.o.b. Pittsburgh.....	3.80	3.80	3.55	1.90
Wire Nails, f.o.b. Pittsburgh.....	3.20	3.20	2.95	1.45
Cut Nails, Mill.....	2.50	2.50	2.45	1.20
METALS:				
Copper, New York.....	16.25	16.12½	16.50	14.50
Spelter, St. Louis.....	4.80	4.30	4.60	....
Lead, New York.....	4.70	4.70	4.65	4.25
Lead, St. Louis.....	4.67½	4.65	4.65	....
Tin, New York.....	26.50	25.50	24.75	22.30
Antimony, Hallett, New York.....	9.75	9.75	9.75	8.75
Nickel, New York.....	38.00	38.00	38.00	38.00
Tin Plate, Domestic, Bessemer, 100 lbs., New York.....	4.84	4.84	4.84	3.15

Chicago. (By Telegraph.)

Office of The Iron Age, 805 Fisher Building, CHICAGO, January 17, 1900.

While large consumers are not placing many heavy contracts and therefore the Iron market appears quiet a very active trade is in progress among the great body of miscellaneous buyers. This is observed in the sharp demand for quick delivery of small lots of Iron and Steel of all kinds and in the remarkably good business enjoyed by the heavy hardware jobbers as well as jobbers of shelf hardware. A year ago the same state of trade was reported, but a marked difference prevails in the conditions. Prices were then advancing and buyers were anticipating their wants freely so as to take advantage of further improvements in values. The buying now being done is not stimulated by prospects of higher prices, but is compelled by actual necessities. The situation, therefore, seems to be really more healthy than 12 months back. Apprehension is felt of scarcity in some lines caused by the interference with manufacturing operations through the shortage of Coke. It is extremely difficult to get enough Coke to satisfy the ordinary requirements of the foundry trade, to say nothing of blast furnaces. The supply of ordinary steaming Coal is also short on account of the enormous consumption caused by the activity in manufacturing as well as the shorter working day among miners, which has curtailed the output of individual mines.

Pig Iron.—Some sales offices report a few sizeable transactions of 500 to 1000 tons each, but generally trade is quiet. A good demand is observed for lots for quick shipment, which is caused by furnace companies being unable to make full deliveries on contracts. They are having trouble in securing enough Coke to run at full capacity, and are further annoyed by the continuous scarcity of cars. The shortage of Coke in this locality is keeping a number of furnaces constantly on the ragged edge, and at any day they may have to be banked to wait for an accumulation of fuel. The inquiries received are quite numerous, and if all of them were to lead to actual business the buying movement would be heavy. Sales agents are confident that the necessities of

many consumers must bring them into the market before very long. Prices are firmly held from first hands, occasional sales being made below the regular prices by parties who can spare a portion of their early purchases to take advantage of the fine profit which present prices represent. We quote for cash as follows:

Lake Superior Charcoal.....	\$25.50 to \$26.00
Local Coke Foundry, No. 1.....	24.50 to 25.00
Local Coke Foundry, No. 2.....	23.50 to 24.00
Local Coke Foundry, No. 3.....	22.50 to 23.00
Local Scotch, No. 1.....	25.00 to 25.50
Ohio Strong Softeners, No. 1.....	25.50 to 26.00
Southern Silvery, according to Silicon..	25.50 to 27.00
Southern Coke, No. 1.....	22.85 to 23.35
Southern Coke, No. 2.....	21.85 to 22.35
Southern Coke, No. 3.....	20.85 to 21.30
Southern Coke, No. 1 Soft.....	21.85 to 22.35
Southern Coke, No. 2 Soft.....	21.85 to 22.85
Foundry Forge.....	20.85 to
Gray Forge and Mottled.....	20.85 to
Southern Charcoal Softeners, according to Silicon.....	21.85 to 25.85
Alabama and Georgia Car Wheel.....	24.85 to 25.85
Malleable Bessemer.....	25.00 to 26.00
Standard Bessemer.....	..... to
Jackson County and Kentucky Silvery, 8 per cent. Silicon.....	32.00 to 32.50

Cast Iron Pipe.—The year has opened auspiciously. Pipe manufacturers report no trouble doing business, with large buyers notwithstanding the high prices now ruling. Contracts are being made for the coming season by a large number of gas and water companies. Municipalities are somewhat slow in making their arrangements, but such business can be depended upon to come into the market in due time.

Bars—A feature of current orders for mill shipments of Bar Iron is the frequent insertion of clauses providing for the prompt delivery of certain sizes. General consumers are short of stock, and jobbers are likewise steadily confronted with the necessity of speedily filling up gaps in their warehouses. The volume of business is quite satisfactory, but special activity is noted in the demand for small lots. Soft Steel Bars have been rather quiet, but prices are very firmly maintained. Mill shipments are quoted at 2.35c. to 2.40c., Chicago, for Common Iron, 2.35c. to 2.45c. for Soft Steel Bars and 2.65c. for Bands. The demand from jobbers' stocks has shown a sharp improvement, and the volume of business is now stated to be fully equal to that of the early part of December. Jobbers quote small lots from stock at 2.90c. upward for Bar Iron, 2.60c. upward for Soft Steel Bars and 3.40c. to 4c. for Norway and Swedish Iron. Concessions are being made on Soft Steel Bars from stock to best buyers.

Structural Material.—The week has brought out a somewhat better business in bridge material. A Western railroad placed a contract covering 3000 tons of bridge work, and another contract for 8000 tons is in the market. Nothing has yet developed in any of the large building projects, but it is understood that some are likely to be closed soon. Manufacturers of Structural Material were never busier than now. They are far in arrears on deliveries, and much business is being held back by contractors simply because satisfactory deliveries cannot be promised. Mill shipments are quoted as follows, Chicago delivery: Beams, Channels and Zees, 15-inch and under, and Angles, 3 to 6 inches, 2.40c.; Beams, &c., 18 inches and over, and Angles over 6 inches and under 3 inches, 2.50c.; Tees, 2.45c.; Universal Plates, 2.45c. to 2.60c. A good demand is reported from the local yards with prices of Beams and Channels quoted at 2.90c. to 3c.; Angles, 2.70c. rates, and Tees, 2.85c.

Plates.—Inquiries for mill shipments are numerous, but buyers are slow to close owing to the irregularity in prices. An exhibition of firmness by manufacturers would probably bring a great deal of the floating inquiry to a settlement. Jobbers report only a moderate movement from stocks. Mill shipments, Chicago delivery, are quoted as follows: Tank, 2.55c. for narrow widths and 2.65c. for the general range of sizes; Flange, 2.80c. to 3c.; Marine, 3c. to 3.25c.; Fire Box, 3.30c. to 5½c. Jobbers quote Tank from store at 3c. to 3.15c., and Flange, 3.25c. to 3.50c.

Merchant Pipe.—It is expected that the local demand will shortly experience a revival, but at present trade is quiet. Carload lots of Black Merchant Pipe are quoted at 50, 10 and 5 to 50 and two 10's, and Galvanized at 57 and two 10's.

Sheets.—Prices are getting a little firmer. Manufacturers are not making the concessions which were easily obtained a short time since. While prices are stronger the demand has also improved. Large buyers are endeavoring to place contracts at present quotations for deliveries running through the year. Manufacturers are unwilling to sell for shipment later than June, and are insisting on delivery of equal portions in both quarters thus covered. Mill shipments of No. 27

Black are quoted as 3c. to 3.15c., Chicago, and Galvanized Sheets at 75 to 75 and 5 per cent. Jobbers report a fair trade, and quote small lots at 3.25c. to 3.40c. for No. 27 Black, and 70 and 10 per cent. off on Galvanized Sheets.

Merchant Steel.—Some business is being done but only in a small way. Prices are very firmly held. Mill shipments, Chicago delivery, are quoted as follows: Smooth Finished Machinery Steel, 2.95c. to 3.05c.; Smooth Finished Tire, 2.80c. to 3c.; Open Hearth Spring Steel, 3.60c. to 3.75c., base; Toe Calk, 3.20c. to 3.50c., base; Sleigh Shoe, 2.75c. to 3c.; Cutter Shoes, 3.45c. to 3.65c.; Ordinary Tool Steel, 7c. to 7½c.; Special, 13c. and upward.

Rails and Track Supplies.—Manufacturers have had a good business in Standard Section Rails. Two important contracts have been closed, one for 50,000 tons for export, as well as all the Fastenings required, and another for a Western road of 10,000 tons. Several smaller quantities were booked. Prices on Standard Sections are continued at \$35 to \$40, according to quantity. Sales of about 1200 tons of Light Rails were also made. They are quoted at \$35 to \$40, according to sections. Prices of Track Fastenings are as follows: Steel Fish Plates, 2.25c. to 2.50c.; Iron Fish Plates, 2.30c. to 2.50c.; Spikes, 2.65c. to 2.75c.; Track Bolts, with Hexagon Nuts, 3.95c. to 4c.; Square Nuts, 3.80c. to 3.85c.; Steel Links and Pins, 3.20c.; Iron Links and Pins, 3.15c.

Old Material.—The supply of all grades is large except Old Iron Rails and Car Wheels. The lack of demand for the former keeps them down, while prices of the latter are rising. Speculation is quite active in Old Steel Rails, but dealers are buying more than consumers. The Republic Iron & Steel Company have adopted the gross ton exclusively as their standard. Being such heavy buyers of Scrap, it is deemed likely that the precedent thus set will be followed by the trade generally, and our quotations are now made per gross ton on all classes and grades. Approximate market prices are as follows, per gross ton:

Old Iron Rails.....	\$25.00 to \$25.50
Old Steel Rails, mixed lengths.....	19.00 to 20.00
Old Steel Rails, long lengths.....	22.00 to 23.00
Relaying Rails.....	28.00 to 30.00
Old Car Wheels.....	24.00 to 24.50
Heavy Melting Steel Scrap.....	18.00 to 19.00
Mixed Steel.....	13.50 to 14.00
Iron Fish Plates and Angle Bars.....	24.00 to 25.00
Steel or Mixed Iron and Steel ditto.....	20.00 to 21.00
Iron Car Axles.....	27.00 to 28.00
Steel Car Axles.....	24.00 to 25.00
No. 1 Railroad Wrought.....	23.50 to 24.50
No. 2 Railroad Wrought.....	20.00 to 21.00
Shafting, Iron and Soft Steel.....	23.00 to 24.00
No. 1 Wrought.....	17.00 to 18.00
No. 1 Country Wrought.....	15.50 to 16.25
No. 1 Mill.....	12.00 to 13.00
No. 2 Mill.....	8.00 to 9.00
No. 1 Busheling.....	14.50 to 15.00
No. 2 Busheling.....	10.00 to 11.00
Iron Car Axle Turnings.....	14.50 to 15.00
Soft Steel Car Axle Turnings.....	13.50 to 14.00
Machine Shop Turnings.....	12.00 to 13.00
Wrought Drillings.....	11.50 to 12.00
Cast Borings and Drillings.....	9.00 to 10.00
Mixed Borings and Turnings.....	9.00 to 10.00
No. 1 Boilers, cut.....	14.50 to 15.00
No. 2 Boilers, cut.....	6.00 to 8.00
Boiler and Ship Scrap.....	16.00 to 17.00
No. 1 Cast.....	15.00 to 15.50
No. 2 Cast.....	10.00 to 10.50
Railroad Malleable Cast.....	16.50 to 17.00
Agricultural Malleable Cast.....	15.25 to 15.75

Metals.—Carload lots of Lake Superior Copper are held at 16½c., and Casting brands at 16½c. Spelter stands at 4.45c. Pig Lead is quiet, with 4.70c. quoted for Desilverized.

Tin Plates.—Nothing new has developed, manufacturers being in receipt of good business, while jobbers report a moderate movement from stock. Prices are unchanged.

Geo. E. Day, 735 Marquette Building, Chicago, has been appointed Chicago manager for the Newport Sand Bank Company of Newport, Ky., producers of Molding Sand for general foundry use.

A. M. Castle & Co. are carrying a well assorted stock of Plates, Tubes, Rivets, Angles, Sheets, &c., in their warehouse at 54 to 60 South Canal street, Chicago. They are Western sales agents for the Lukens Iron & Steel Company, Coatesville, Pa.; the Reading Iron Company, Reading, Pa.; the Champion Rivet Company, Cleveland, and other manufacturers of Railroad and Boiler Makers' Supplies.

Julian L. Yale & Co., 1117 The Rookery, Chicago, special representatives of Iron and Steel manufacturers, announce that R. C. Hallett has associated himself with their firm. The connection thus made will be of mutual advantage. The firm have gained a prominent position in the Iron trade during a comparatively short career.

Philadelphia.

Office of The Iron Age, Forrest Building,
PHILADELPHIA, PA., January 17, 1900.
(By Telegraph.)

The market appears to be in good healthy condition, but there is no distinct change from that noted in the mail report. Pig Iron is doing well, prices steady, demand improving. Plates are in good demand and mills running full time. Bars are very active and prices have a strong look. Some of the outside mills are asking 0.05c. more than they would have been willing to accept during last week. There is an abundance of work, and prospects appear to be favorable for an active market and steady prices.

(By Mail.)

The third week of the new year has been entered upon without finding any material change in the conditions which were ruling a month ago. As a matter of fact, it is difficult to say whether the market is better or worse. In some cases prices are a trifle lower, in others they are as firm as they have been for months past, but there have been no developments which are distinct enough to enable any one to say with confidence that the next change in the market will be toward better prices or the reverse. Guesses may be made, and they may turn out to be correct, but they are nothing but guesses after all. There is really nothing in the situation to furnish a basis for anything beyond that. Meanwhile, however, there is an undercurrent of feeling that things are going to be better (1) because the dullest season of the year, which is rapidly fading away, has caused no serious diminution in the volume of business, and (2) because there has been no accumulation of stocks, while there is already considerably more inquiry, indicating larger sales in the near future. The expectation of improvement is therefore probably well founded, notwithstanding the fact that during the past week prices are lower on Billets, Plates, Sheets and possibly on one or two other specialties. In face of this it may appear to be something of a contradiction to say that the market is likely to do better when it is conceded that prices are lower. There are special reasons for the lower prices, however. Billets at \$40, and Plates at 3c., were relatively too high, consequently the decline to a parity with other articles is not necessarily a bear argument. Pig Iron, however, which is the basis of the entire Steel interest, has held firmly all through the dullness of the past 60 days, and as there is no appreciable increase in stocks, it is not improbable that with a better demand prices will improve. This point has already been reached, that is to say, there is more demand, and prices of Pig metal are already beginning to develop increased firmness, although they are not quotably higher than they were a month ago. Taking everything into consideration, therefore, there is room for hopeful expectancy, and while the change from last week is so slight as to be hardly perceptible, yet the manifestations of a better feeling are stronger, and if continued for a couple of weeks more it will probably be safe to say that the entire list will work in the direction of higher prices.

Pig Iron.—The market for Pig Iron looks a little better, not that it has been at all bad at any time, but there are signs of increasing activity, and some movements which indicate the probability of a stiffening in prices. There is a fair supply of Iron at quoted rates, but anything like active buying would easily start an upward movement in prices. Stocks are so small that there is no necessity for pushing sales, and especially with such a prospect as there is for a continued good demand. The statement in last week's *Iron Age* shows that stocks were only 5000 tons more on January 1 than they were on November 1, and this period includes the month in which deliveries are usually about the lowest in the entire year. On November 1, including warrant Iron, we had in round numbers 128,000 tons. On December 1 we had 123,000 tons, and on January 1 132,000 tons, a very small margin for a consumption estimated at not less than 275,000 tons per week. The probability of lower prices in the near future appears, therefore, to have very little foundation to rest upon, although there is no desire to advance them beyond the figures now ruling. What the trade want above all other things is steady prices, the chances for which at the present time appear to be very good. Sales in most cases have been at a full average of the figures recently quoted, at which to-day's market may be considered strong with a moderate degree of activity. Prices are about as follows for seaboard or nearby deliveries: No. 1 X Foundry, \$25 to \$25.50; No. 2 X Foundry, \$23.25 to \$24.25; No. 2 Plain, \$22.50 to \$23; Standard Mill Iron, \$20.50 to \$21; Basic, \$23 to \$23.25; Bessemer, nominal, \$24.50 to \$25.50; Bessemer Low Phosphorus, \$27 to \$28, and Charcoal Iron, \$28 to \$30.

Muck Bars.—There is a firmer feeling and more inquiry, particularly from the West. Asking prices have been about \$30.50, at mill, and while that figure might be accepted, it would not take much of a demand to start a movement toward higher prices.

Billets.—The market is extremely dull, and although some business has been done at \$37 to \$37.50, buyers are taking very little at the figures named, and are not bidding at all for large lots. The feeling seems to be that prices are more or less artificial, and this impression will have to be removed before anything like active buying takes place.

Plates.—There is a good demand for Plates, and inquiries are on the market for lots of considerable importance. Prices are lower than they were a week ago, but at the decline a good business has been done, and considerably more would be done if buyers were satisfied that bottom figures have been reached. Two or three mills in this vicinity are competing for business, and as they have only recently gone into operation, buyers have more strings to their bow than they had during the stringency of last year, and are therefore less anxious than they have been heretofore. Prices for seaboard or nearby deliveries are about as follows: Steel Plates, 1/4-inch and thicker, 2.45c. to 2.50c.; Shell, 2.60c. to 2.65c.; Flange, 2.80c. to 2.90c.; Fire Box, 3.10c. to 3.15c.; Charcoal Iron Plates, C. H. No. 1, 3c.; Best Flange, 3.50c.; Fire Box, 4c.

Structural Material.—There is a great deal of bridge work coming up, and prospects in this branch of business are extremely favorable. Mills have plenty of work in hand, but there is no difficulty in placing orders for moderately quick delivery, which, however, is likely enough to be a temporary condition. Meanwhile prices are steady, and for seaboard and nearby deliveries are quoted as follows: Beams and Channels, 15 inches and under, 2.40c.; Angles, 3 to 6 inches, 2.40c.; Zee Bars, 2.40c., f.o.b. Philadelphia; Angle Bulbs and Deck Beams, 2.63c.; Tees, 2.45c.

Bars.—The demand for Bars is remarkably heavy, and prices are beginning to show increased firmness, although there is more disparity in quotations than in ordinary times. This is due in part to the increasing number of independent mills, who are not bound by the association prices. The last mentioned, however, are not as uniform in their rates as they might be, although the majority maintain a pretty firm position, which is not difficult, considering the heavy demand. Quotations are nominally the same as last week, but the tone is stronger than it was at that time. Quotations for Philadelphia or nearby deliveries are as follows: Ordinary Iron, 2.10c. to 2.15c.; Refined Iron, 2.20c.; Test Iron, 2.30c.; Steel Bars, 2.50c. to 2.60c.

Sheets.—The demand is slow, and on lots of good size prices are lower. There is a good deal of inquiry, but it is evident that some of the mills are anxious to increase the amount of work which they now have on their books. Prices about as follows for small lots. Best makes are quoted as follows (Common Sheets two-tenths less): No. 10, 2.75c. to 2.85c.; No. 14, 2.95c.; No. 16, 3c.; Nos. 18-20, 3.05c.; Nos. 21-24, 3.15c.; Nos. 26, 27, 3.25c.; No. 28, 3.35c. to 3.45c.

Old Material.—It cannot be said that there is any improvement in the situation, although sales are occasionally made at pretty full prices, but it depends upon which side is most anxious to make the trade. Sales have been made at \$22 for Heavy Steel Scrap, \$25 for Choice No. 1 Wrought, \$17.75 to \$18.25 for Machinery Cast, \$15 for Turnings and \$13.50 to \$14 for Borings. Buyers are very offish, however, and are very careful in making bids, but as a rule bids and offers are about as follows for deliveries in buyers' yards: Choice Railroad Scrap, \$23 to \$26; No. 1 Yard Scrap, \$19 to \$20; No. 2 Light Scrap, \$13 to \$14; Machinery Cast, \$17.50 to \$18.50; Heavy Steel Scrap, \$20 to \$21; Old Iron Rails, \$26 to \$28; Old Steel Rails, \$21.50 to \$22.50; Wrought Turnings, \$15 to \$15.25; Cast Borings, \$13.50 to \$14; Old Car Wheels, \$20.50 to \$22; Iron Axles, \$26 to \$28; Steel Axles, \$27 to \$29.

The Maryland Car Wheel Works, Baltimore, Md., have appointed Edward J. Etting of Philadelphia as their exclusive agent for sale of their Wheels in New York, Pennsylvania, New Jersey, Delaware and the New England States. This plant is operated by the same parties connected with the Birmingham Car Wheel Company of Birmingham, Ala., and has a capacity of 600 Wheels per day.

The Carnegie Steel Company, Limited, will install this week in their Upper Union mills, Pittsburgh, a smoke consumer of a new design. It is the intention of the concern to thoroughly test this smoke consumer, for which the inventor has made very strong claims.

Pittsburgh.

Office of *The Iron Age*, Hamilton Building, }
PITTSBURGH, January 17, 1900. }

(By Telegraph.)

Pig Iron.—The established price of \$24 at Valley for Bessemer Iron for first half is being held, but very little metal is being sold. Consumers are covered. The furnaces are sold up and the market is likely to be quiet for some time. The stock report issued by the Western Pig Iron Association shows an increase in stocks of Pig Iron on January 1 over December 1 of close to 20,000 tons. The Valley furnaces have included Forge Iron in their agreement, and fixed the price at \$21.50, at furnace. Outside Iron, however, can be had at lower prices. We quote Bessemer, \$24; Gray Forge, \$20.50 to \$21.50, the latter the association price, all at Valley furnace. No. 2 Foundry, \$22.35 to \$22.50 for Southern, \$23 to \$23.25 for Northern; Southern Gray Forge, \$20.50 to \$20.75; Local Gray Forge, \$21.25 to \$21.50; Bessemer, \$24.90, all f.o.b. Pittsburgh. We note a sale of 600 tons of Gray Forge at a price equivalent to \$21.25, Pittsburgh.

Steel.—The market is very dull and the nominal price is \$35, f.o.b. Pittsburgh. However, on a firm offer it is probable \$35 at mill could be done for Slabs and probably less for Billets. A local mill is credited with having sold 10,000 tons for Eastern shipment.

Sheet Bars.—We quote nominally at \$36 at mill. The market is very dull.

Muck Bars.—We quote best grades at \$30 to \$30.50, Pittsburgh.

(By Mail.)

The Iron market continues somewhat quiet, and in view of the light business for the past month or two, it is very evident that the large consolidations made in the Iron trade in the early part of last year, and late in 1898, are doing much to hold up the market, and are responsible for the strength it is showing. Were all the constituent companies of the large concerns under their own management, as they once were, and actively seeking tonnage, it is more than likely that prices would be considerably demoralized. However, in the last week demand for Finished Material has shown some improvement, and there is also a good deal of inquiry for Steel. One round lot has been sold to an Eastern mill, and the leading consumer is reported to be figuring on a very large tonnage. The established price of \$35 is still being quoted, but we understand Steel has sold at lower figures. The Coke trade continues exceedingly active, with all the Coke concerns practically sold up for the first half of the year.

Plates.—The demand continues right, and some of the smaller Plate mills are going after tonnage very aggressively and naming low prices. While the general market on Tank, ¼-inch and heavier, for narrow widths, is 2.25c., we are advised that this price has been materially shaded on desirable orders. We quote: Tank, ¼-inch and heavier, 2.25c. to 2.50c., the higher price for wide sizes; Shell, 2.50c. to 2.60c.; Flange, 2.60c. to 2.70c.; Marine, 2.70c. to 2.80c.; Fire Box, 3c. to 3.25c., depending on quality. It is probable our quotations on Tank Plate would be shaded for good orders.

Beams and Channels.—A fair amount of orders for small lots are being placed, but the market is quiet. A good deal of work is coming up in the East which will likely be placed before long. Included in this work is close to 15,000 tons of Bridge Shapes for a leading railroad. We quote: Beams and Channels, 15-inch and under, 2.25c.; 18, 20 and 24 inch, 2.35c.; Angles, 3-inch and up to 6 x 6, 2.25c.; Angles, under 3-inch, 2.50c.; Tees, 3-inch and larger, 2.30c.; under 3-inch, 2.50c.; Zees, 3-inch and larger, 2.25c.; Grooved Rolled Plates, 2.40c. to 2.50c., Pittsburgh.

Ferromanganese.—Ferro continues scarce, and for small lots \$125 is being quoted. For round lots this price would likely be shaded.

Bars.—The market on both Iron and Steel Bars is strong, but the volume of business being placed is light. Buyers seem somewhat apprehensive of lower prices, and are buying only from hand to mouth. We quote Common Iron Bars at 2.15c., Valley mill, and Steel Bars at 2.20c. to 2.25c., Valley mill. Local mills quote Steel Bars at 2.25c. and up to 2.40c.

Sheets.—As noted last week, there is more inquiry for Sheets and the tone of the market is stronger. This

is due to the fact that the trade are pretty well advised by this time of the movement under way to combine the Sheet mills, and are placing orders more liberally, fearing that prices may be advanced in case the deal goes through. The Sheet mills generally are refusing to take orders, however, for delivery further ahead than February. We quote No. 27 Black Sheets, one pass, at 2.85c. to 2.90c.; No. 28, 2.95c. to 3c.; Galvanized Sheets are also stronger, and we quote at 75 and 5 per cent. to 75 and 7½ per cent., 15 cents freight, in carload lots. We are advised that 75 and 7½ per cent. is minimum of the market.

Steel Rails.—The market is quiet and quotations continue at \$35 for standard sections, f.o.b. at mill.

Skelp.—There is more inquiry, and the tone of the market seems to be stronger. We are advised that the two leading interests are holding Grooved Iron and Steel Skelp at 2.15c. at mill. Some of the small independent mills, however, are quoting 2c. to 2.10c. at mill. We quote Sheared Iron and Steel Skelp at 2.35c. to 2.40c., f.o.b. Pittsburgh.

Merchant Steel.—Demand is only fair, and prices on some lines are lower. Buyers are placing orders only for small lots, and the mills are running mostly on old contracts. We quote: Toe Calk, 2.75c., base; Tire, 2.50c. to 2.60c.; Open Hearth Spring, 3.25c.; Plow Slabs, 2.75c. to 3c.; Machinery Steel, 2.50c.; Sleigh Shoe, 2.75c. to 3c.; Cutter Shoes, tapered and bent, 3.75c. to 4c.; Rolled Lay Steel, 3.75c.; Hammered Lay Steel, 4.50c.; Tool Steel, 7c. and upward, freight allowance not to exceed 25 cents; terms, except Tool Steel, 30 days, net cash.

Pipes and Tubes.—Owing to the mild, open weather, the demand for Pipe has kept up remarkably well. Buyers, however, are buying mostly in small lots. We quote Merchant Pipe, Black, 50 and 10 and 10 per cent.; Galvanized, 57 and 10 and 10 per cent. in carload lots, delivered. Small lots of Black are quoted at about 50 and 10 per cent. at mill, and Galvanized 57 and 10 per cent. at mill. We quote Screw and Socket Joint Casing at 37½ per cent.; Inserted Joint, 32½ per cent., with an optional 5 per cent. to dealers. We quote Boiler Tubes as follows: 1¼-inch and 1½-inch Iron, 40 per cent.; Steel, 40 per cent.; 1¾ to 2½ inch Iron, 50 per cent.; Steel, 55 per cent.; 2¾-inch and larger Iron, 52½ per cent.; Steel, 55 per cent., with an extra 5 per cent. in carloads; less than carloads, f.o.b. maker's mill, Pittsburgh, while carloads are delivered.

Connellsville Coke.—The unprecedented demand for Coke continues, and both Furnace and Foundry can hardly be had at any price. Last week there were 18,850 ovens in the Connellsville region active, and only 753 idle, the output being 200,450 tons. The H. C. Frick Coke Company have repaired the 110 ovens at West Overton and started up 75 of them. Very high prices are being paid for Coke, especially for prompt shipment. We are advised that small lots of Furnace Coke have sold at \$3.50 a ton for early delivery, while Foundry Coke is being quoted at \$3.50 to \$4 a ton. Most of the large consumers of both Furnace and Foundry are covered by contracts placed some time ago at lower prices.

Iron and Steel Scrap.—There is a fair amount of Scrap being sold, but demand is not as urgent as it was some time ago. Consumers are holding off, waiting for lower prices. We quote: Old Steel Rails, short pieces, \$23.50 to \$24; Low Phosphorus Melting Scrap, phosphorus guaranteed 0.035 or under, \$27; Plate Shearings, \$22; Mixed Steel, \$20 to \$20.50; No. 1 Railroad Wrought Scrap, \$24. We note a sale of 100 tons of Mixed Steel at \$20, delivered, buyer's mill.

Moorhead Brothers & Co., Incorporated, Pittsburgh, Pa., manufacturers of Bar, Boiler, Sheet, Tank and Iron and Steel Skelp, are making considerable improvements at their mill, putting in a new large plate mill complete, including two new gas furnaces for same. They are also building new additional puddling furnaces, besides putting up four or five waste heat holders. They have also completed putting up a large traveling crane. In fact, since January 1, 1899, this concern have completely rebuilt their old mill, with the exception of the puddling furnaces.

The Pittsburgh Coal Company have recently closed large contracts for supplying coal to the American Tin Plate Company, the American Steel & Wire Company, the American Steel Hoop Company and the National Steel Company. It is understood that these contracts are to be divided with the Consolidated Coal & Coke Company of Pittsburgh, which is a combination of river mines.

Cincinnati. (By Telegraph.)Office of The Iron Age, Fifth and Main streets, {
CINCINNATI, January 17, 1900. }

Aside from the fact that there are a few more inquiries for lots of Pig Iron up to 4000 tons, there has been no perceptible change in the market since a week ago. The volume of new business is perhaps swelling a little, but not enough to cause any comment. There is but little expectation of much increase within the next week. The energies of the trade, however, are pretty well occupied with the care of business already booked. Consumers are taking Iron as fast as they can get it, and are in many cases pushing for faster deliveries. In the absence of any buying movement the price-list is nominally unchanged and the situation is considered a very strong one. We quote, f.o.b. Cincinnati:

Southern Coke, No. 1.....	\$21.75
Southern Coke, No. 2.....	20.75
Southern Coke, No. 3.....	19.75
Southern Coke, No. 4.....	19.50
Southern Coke, No. 1 Soft.....	21.75
Southern Coke, No. 2 Soft.....	20.75
Southern Coke, Gray Forge.....	\$19.00 to 19.25
Southern Coke, Mottled.....	19.00 to 19.25
Ohio Silvery, No. 1.....	30.00
Ohio Silvery, No. 2.....	29.00
Lake Superior Coke, No. 1.....	\$24.00 to 24.50
Lake Superior Coke, No. 2.....	23.00 to 23.50

Car Wheel and Malleable Irons.

Standard Southern Car Wheel, Chilling Grades.....	\$25.75 to \$26.25
Standard Southern Car Wheel, No. 2.....	24.75 to 25.25
Lake Superior Car Wheel and Malleable.....	25.50 to 26.50

Plates and Bars.—The market has been quite active and seems to have entirely recovered from the weak spots of a few weeks ago. Prices are unchanged. We quote, f.o.b. Cincinnati: Iron Bars, carload lots, 2.25c., with half extras; small lots, 2.60c., with full extras; Bar Steel, in car lots, 2.50c., with half extras; small lots, 2.95c., with full extras; Iron Bar Angles, 1½ x 3-16 inch and larger, in car lots, 2.65c.; small lots, 2.80c.; Sheets, No. 10, 3c. to 3.15c.; No. 27, Stove Pipe, 3.25c.; No. 27, Steel, 3.35c.; Plates, 2.75c. to 3c.

Old Material.—The market has been quiet, and has shown some weakness. Cast Scrap and Iron Rails are quotably lower. We quote, f.o.b. Cincinnati: No. 1 Wrought Railroad Scrap, \$22 to \$23 per net ton; Cast Scrap, \$13.50 to \$14.50 per gross ton; Axles, \$26 to \$27 per net ton; Iron Rails, \$26 to \$27 per gross ton; Car Wheels, \$22 to \$22.50 per gross ton.

The Lane & Bodley Company to-day sent a communication to the Water Works Commission, throwing up their contract for the pumping engines. The contract amounts to \$520,000, and is secured by a bond for \$200,000. The commission will advertise for bids again and proceed against the bonding company for the full amount of the bond, as it is expected that under present conditions the next bidding will be on a basis 75 to 100 per cent, higher than the old contract.

St. Louis. (By Telegraph.)Office of The Iron Age, 1205 Chemical Building, {
St. Louis, January 17, 1900. }

Pig Iron.—Large inquiries are still kept off the market. Orders for small lots come in, but do not aggregate a heavy tonnage. Southern furnaces say they have practically nothing on hand, all available Irons being swept up. Not much relief has yet been had from the ante-bellum festivities indulged in by furnace hands, and shipments are being made all too slowly as a result. It is probably to the consumers' interest under the circumstances to hold off, as, were eagerness shown to buy, they would naturally bid up prices on themselves. No softness in price has come to light, and taking price of Ore in connection with fuel outlook, no shading is at all anticipated. It is understood that bids at \$5 per ton have been made for Coke. On the whole, it does not seem that production will be materially increased for some time. No let up is noted in pressure for delivery on contracts, but pleading is made to advance shipping dates. Wheel Irons are reported extremely scarce, furnaces being generally sold up to July. Charcoal Iron, Close Gray No. 3, recently sold at \$24 on cars at a Missouri furnace. We quote on cars St. Louis.

Southern, No. 1 Foundry.....	\$22.25 to \$22.50
Southern, No. 2 Foundry.....	21.25 to 21.50
Southern, No. 3 Foundry.....	20.25 to 20.50
No. 1 Soft.....	22.25 to 22.50
No. 2 Soft.....	21.25 to 21.50
Gray Forge.....	20.00 to 20.25

Bars.—Mills say demand is better for December and showing greater improvement. Specifications are being presented, and new contracts made as needs develop. Majority of buyers said to be covered for at least three

months, and disposition of those not secured said to be to seek cover. Mill quotations on Iron remain at 2.35c., base, half extras, East St. Louis, in carload lots. No change has taken place in jobbers' prices, which are 2.75c. to 2.90c., base, full extras, as to quantities and assortment. Steel Bars are now definitely quoted by mills at 2.40c., base, half extras, in carload lots, East St. Louis. Jobbers' price is 3c., full extras.

Rails and Track Supplies.—No considerable movement is noted, but roadmasters, though working on winter basis, are doing all they can with the labor at command. We quote: Splice Bars, Steel, 2.55c.; Iron, 2.55c.; Track Bolts, with Square Nuts, are now 3.80c.; with Hexagon Nuts, 3.95c.; Spikes, 2.85c.; Steel Links and Pins, 3.20c.

Pig Lead.—Market is strong and prices firm. It is an absolute fact that no grounds existed for low quotations in press reports last week. Brokers themselves paid 4.65c for Chemical late in the week, and begged for it. Twenty-five tons Chemical also sold at 4.67½c. Holders of Chemical ask 4.65c. to-day against 4.60c. bid. Desilverized is held at 4.67½c. Joplin Lead Ore remained at \$28 per 1000 lbs.

Spelter.—Weak and inactive, at 4.30c. as fair price. About 800 tons bought at low prices said to be in brokers' hands, and so long as this remains prices may keep down. At present cost of Ore smelters see no profit, and one of the principal companies have posted notices of a contemplated shut down. It is rumored that negotiations are again about to be attempted to reconcile differences between prices of Ore and Spelter. Ore prices fell off \$1.50 on high Assay and \$3 on lower grades. The top price obtained was \$35 per ton, the buying being rather meager.

Cleveland.

CLEVELAND, January 16, 1900.

Iron Ore.—The sales of Iron Ore continue to be few and far between, despite the fact that some of the sales agents who are in possession of new grades from recently discovered deposits or newly developed properties are making no little effort to push their sale. A number of furnace interests have their requirements covered until the close of 1900, and they do not manifest any uneasiness regarding the supply for the first four months of 1901, preferring, as a rule, to await developments in the hope that better prices will prevail. In the vessel market the Ore men are practically through, and no tonnage has been taken for some time. Almost every owner of the larger type of lake vessels now has some Ore under contract. How very scarce available Ore carrying vessels will be next season is well evidenced by the effort of the Canada-Atlantic Transportation Company during the past week to secure boats to replace the fleet which in former seasons they chartered from M. A. Hanna & Co., but which the latter have transferred to the National Steel Company. Nothing has been done with reference to Ore unloading charges for the coming season at the docks on Lake Erie, and it will probably be several weeks before the matter is taken up. The Ore Handlers' Union will have a representative at the meeting of the Lake Carriers' Association, to be held this week in Detroit, and he will make a report to the officers of the organization, after which a general meeting of the men at all lower lake ports will be held with a view to fixing a rate for next season's work. There is no doubt but that an advance over last season's price will be demanded, and it is equally certain that if there is any way in which the dock managers can escape from the tyranny of the unions every effort will be put forth to accomplish it. The rate for winter work on the docks was settled some time ago, and the business is going along with comparative smoothness. Ore is going forward from the Lake Erie docks to the furnaces pretty freely, but if cars were more plentiful the movement would be much heavier. All the dock managers are complaining regarding a shortage of cars.

Pig Iron.—The past week has been somewhat quiet in Pig Iron circles, although affairs have livened up somewhat as compared with the previous week. Buyers of Bessemer for the second half of the year are not yet in the market, but it is expected that they will be any day. Sales of Foundry grades are being made every day, and there is an increasing volume of inquiry, so that furnacemen anticipate that the opening of February will see the market for these grades for delivery during the last six months of the year fully open. The furnacemen naturally look upon January as the duldest month of the year, and while the present month has afforded a justification of the expectation the market has recovered more rapidly than was naturally to be expected. Despite heavy complaints which continue to come from dock managers and some furnacemen there

is no doubt that the car situation has eased off considerably since the close of navigation on the lakes. The scarcity of Coke is, however, as great as ever. In many instances furnaces are compelled to shut down for periods of two and three days at a time, and the worst phase of the situation is found in the indication that relief is likely to come only very gradually. The Coke situation is working something of a hardship in some instances. There is still more or less Pig Iron contracted for delivery at old prices, and while in a majority of cases there is on hand for this Ore purchased at the old rates, the furnacemen are finding themselves compelled to purchase Coke and Limestone at the new prices. Many furnaces have contracted for Coke for the first six months of the year at \$2, but new sales are not, as a rule, made on a basis of less than \$3.50.

Finished Material.—There is no denying the fact that the situation is somewhat less active than it has been for the past three or four months, and the general opinion in the trade appears to be that it will become more so in view of the fact that February is generally regarded by Finished Material men as the duller of the year. At the same time the mills are still crowded with business, and in many cases cannot even yet book any business for prompt delivery. The general opinion among sales agents is that prices may be expected to continue on about the present standard until spring, and that a stimulating effect will then be imparted by new operations. There is considerable talk of new building operations during the second and third quarters of the year, but little business has yet been closed up. There is an almost imperceptible weakening in some grades, but all prices remain as last quoted.

Old Material.—The situation during the past seven days has been absolutely devoid of change. A fair volume of buying at prices which seem to be pretty satisfactory to sellers continues, and no scarcity of any grade of Scrap is reported. Prices may be shaded off slightly by the anticipated February dullness, but it will not be extensive.

Birmingham.

BIRMINGHAM, ALA., January 15, 1900.

Half the first month of the new year is gone and practically there is no change in prices, the market having kept on an even keel on a basis of \$17.50 for No. 2 Foundry, with sales of small lots for quick delivery at irregular advances. There have been no round lot sales, nor has there been any active inquiry for round lots. During the past week there was some inquiry for a few lots of 1000 to 2000 tons, but the deliveries did not meet with sellers' views and no business resulted. The trade has been for medium and small size orders and about absorbed what could be spared. The inquiries last week were regarded with interest because they indicated that buyers were feeling around looking for soft spots. They found none here. One seller summed up the situation sententiously with the remark: "We have on our order books enough orders to absorb our anticipated output for eight months. The price is fixed. Our matured and maturing deliveries are being clamored for by the buyers through every mail we get. We have constant inquiries we are declining to price from both the domestic and foreign trade. Why, then, should we disturb our minds about lower prices when such a healthy condition of the trade exists?" There cannot now be obtained in any quantity any assortment of grades for any part of the first half of this year. You can pick up some of one grade from one seller, some of another grade from another seller and in this way fill out an assortment. For steel there has been a good inquiry for delivery during all the year, and sales could have been made freely. As it is they are now over 80,000 tons, exclusive of engagements to the Rod and Wire Nail mill.

Operations have been retarded at the Steel mill by the difficulties inseparable from the starting of such a great enterprise. The latest mishap was to the blooming mill. But they all have been remedied, and each day gives that experience whose acquisition is necessary to smooth efficiency in operation.

There was some inquiry the past week for Basic Iron from Germany, but it had to be declined. So fixed has the demand become for this grade and to such proportions has it grown that it has been determined by the Tennessee Coal, Iron & Railroad Company to put another furnace on it, so that in a short time now its production will be increased. The erection of their fifth furnace at Ensley is proceeding smoothly, but it will be some time before it is ready to light. The Gadsden Furnace will blow in this week, while to day has been set for the blowing in of the Talladega Furnace. There are a small number of other furnaces whose time for blowing in is set for the near future. But it is dependent partly on the accumulation of supplies, and this is so uncertain as to make the time

of blowing in indefinite. Every effort has been made to increase the Coke supply, but progress has been slow.

So much has the demand kept ahead of the supply that some interests have declined of late to price any to buyers, their own wants having grown to fully equal their output. One firm report that they could place 2000 tons daily alone to Mexican points.

Several mining companies have been formed of late and all of them will open new mines. This has added to the activity among the machinery firms, whose previous orders were far ahead of their ability to supply with any promptitude. This delay is seriously felt, as there is no difficulty in placing contracts by those who can deliver Ore. The old Baxter Stove Works have been sold to some Western parties, who will change them into a Soil Pipe works. They will organize their company with a capital of \$50,000, to be increased to \$200,000, and propose in 30 days to transform it to their purpose and to have it in operation. They will employ 100 workmen.

Since my last letter 80 per cent. of the stock of the Bessemer Rolling Mill has been sold. The purchase was made by an individual to whom the transfer of stock was made, but it is an open secret that the purchase was made for account of the Republic Iron & Steel Company. No confirmation of it can be given from an authoritative source, but it is safe to accept it as true. The leading officials of this company were here some days ago on a tour of inspection and investigation. They pleaded guilty to a determination to erect two 200 ton furnaces at Thomas, on one of which work will shortly begin, to be followed by a commencement on the second furnace after due progress has been made. They also admitted that a Steel mill, to be fully equal in extent and efficiency to the one at Ensley City, would also be erected at Thomas. Other improvements to their interests are going on. The principal owners of the Cement plant at Ensley City were here the past week, with the object of determining, according to current gossip, the question of increasing their capacity. One of the difficulties under which they have labored so far has been regular and certain delivery of the Furnace Slag to Cement mill; but this is being gradually remedied. With the building season opening with all kinds of enterprises on foot the contracts offered them are far beyond their ability to accept. The Steel Chain people have also been here to definitely determine the extent of their improvements. They will add several furnaces (open hearth) to the old Henderson Steel plant and erect a complete plant.

As we approach early spring talk of other enterprises is again common. While many of them depend upon circumstances there is no doubt that enough of them will mature to make this the busiest and the most important year in the history of this district. The interest manifested by capital in affairs has given confidence to those who needed encouragement, and any enterprise that has merit in it attracts investors and is easy to start on a solid foundation.

The German Iron Market.

ESSEN, December, 1899.—The year 1899 was one of brilliant prosperity for the German Iron industry. The production of Pig Iron for the first time reached a total of 8,000,000 metric tons, and it might have been even greater had the supply of Coke been adequate. There was a great scarcity of Pig Iron during the whole year, so that a larger output on the part of the blast furnaces would have found eager takers. Quite recently a very troublesome scarcity of Coal has developed in nearly all the branches of the Iron industry, which is caused by the disturbances in transportation, due to prolonged frost. The activity on the part of the collieries has been disturbed also by scarcity of cars, so that for days at a time thousands of miners were out of work. So far as the Pig Iron market is concerned activity continues unabated, and the question of supply for the year 1900 is not yet solved, there being a considerable shortage of Pig Iron for the second half, both as relates to mill grades and to Steel making grades. Recently large blocks of English Mill Iron have been purchased, which, it is true, is very dear, costing from 88 to 90 marks, delivered to Rhenish Westphalian mill for the first and second half. It is understood, however, that English Mill Iron is now practically sold out, so that the works really do not know how and where to cover their requirements, little having been heard lately of the importation of American Pig Iron once so much dreaded and now so welcome. Prices of Pig Iron are as follows: Basic Bessemer, 86 marks; Foundry No. 1 and Hematite, 76 marks; No. 3 Foundry, 92 marks; Special Mill Iron, 97 to 79 marks; English Mill Iron, 89 to 90 marks; Luxemburg Mill Iron, 95 marks; German Bessemer, 96 marks; English No. 3, f.o.b. Ruhrort, 91 marks; Luxemburg Foundry No. 3, 85 marks, f.o.b. Luxemburg.

The Steel syndicate has lately closed up its sales for the second half of the current year, and yet the requirements of the rolling mills have not been covered by far.

Prices are as follows: Ingots, 117 marks; Blooms, 122 marks; Billets, 127 marks; Slabs, 131 marks; all Basic Bessemer quality and ordinary dimensions, with extras for special qualities and dimensions.

The exceedingly lively movement in the rolling mill industry during the summer and fall has now lessened somewhat, as is natural at this season of the year. The rolling mills, however, are so far behind their orders that it will take them well into spring to fill them. Orders are on hand with all of the mills for Bar Iron for a period of eight to ten months. The price for Iron Bars is 210 to 220 marks, and for Steel Bars, 180 marks. Rivet Iron is quoted 235 marks and Rivets of good merchantable quality for boilers, bridges and shops, 295 to 300 marks. Open Hearth Angles are quoted 195 marks.

The position of the Plate and Sheet market is thoroughly satisfactory. There is an ample amount of work up to the middle of 1900, and beyond, which will keep the mills running to full capacity. Here, however, the scarcity of Pig Iron and of Steel, and more recently the scarcity of Coal, has been a troublesome feature, so that the production during December was below that of previous months. Sheets are quoted 210 to 220 marks; Steel Boiler Plates, 210 to 215 marks; Iron Boiler Plates, 270 to 330 marks; Steel Tank Plate, 195 to 200 marks, and Iron Tank Plates, 240 marks.

The Beam business continues at the liveliest rate. Since stocks at the mills are down to vanishing point, and since the cold weather puts an end to consumption for the present, the dealers have seized the opportunity to stock up as much as possible with Beams in order to be well supplied for the next building season. The price remains unchanged at 130 marks, f.o.b. Burbach, base.

So far as Hoops and Bands are concerned the works are covered with orders for the whole of 1900, and will not take any further contracts. The price of 190 to 192½ marks, which has hitherto prevailed, still continues. The Pipe mills are as busy as possible, and are making very big profits. The scarcity of Skelp is not quite as great as it has been.

In the Wire trade the Wire drawers are suffering from scarcity of material, which is all the more deplored since prices are very remunerative. The deliveries of Drawn Wire from Germany to China have stopped entirely, and in the Japanese market conditions are such that that outlet will be lessened in importance. Japan is appearing as a buyer of Wire Rods, which are worked up in the country itself.

In Wire Nails the home market takes the regular quantities at remunerative prices. In the export trade, however, sacrifices continue to be necessary to meet American competition.

In the last few days the Prussian State railroads have ordered 600 locomotives, 630 passenger cars, 220 baggage cars and 8884 freight cars. Of the locomotives five will be ready for exhibition at Paris.

The Belgian Iron Market.

BRUSSELS, December 26, 1899.—During the past few weeks the Belgian Iron industry has suffered very keenly from a lack of cars. While this is usually true at this season of the year as the result of a rush for cars on the part of the sugar refineries and on the part of collieries to supply domestic requirements, it has been very much worse this year, several of the Iron works having been forced to close down for days at a time, and sometimes for a whole week, on account of lack of Coal. Both Coal and Coke continue to be extremely scarce and dear in Belgium. Furnace Coal is quoted 21 and 22 francs per ton, while small lots of Coke have been sold as high as 40 to 45 and even 50 francs per ton. Thus the prices of fuel are rapidly approaching the extraordinary figures of 1873, and naturally the collieries are making extravagant profits. Belgium is unable to supply its domestic consumption. Even the Belgian State railroads have been forced to buy 200,000 tons of Coal in England, and Belgian manufacturers had preceded them in this course.

In order to obtain some idea as to the growth of the purchases of foreign fuel by Belgium it is only necessary to make a comparison between the imports during the year 1899 and the year 1898. During the first 11 months of 1899 the imports of Coal were 2,570,443 tons, as compared with 1,997,061 tons during the corresponding period of 1898. The imports of Coke grew from 164,022 tons during the first 11 months of 1898 to 271,720 tons during the first 11 months of 1899.

While Germany furnishes us with the greater part of the Coal and Coke we import, England has made rapid progress during the last year and practically doubled in the first 11 months. In 1899 the imports were 640,425 tons from England. If at this time the Belgian Iron industry did not have the English fuel market to draw upon it is certain that many metallurgical establishments would be closed down.

The scarcity of Coke in Belgium is such and its quality so poor that the blast furnace owners have decided to form a company whose object is to manufacture Coke for their own use from English Coal. The plant is to be established close to the port of Antwerp.

The question is asked in Belgium why American Coal producers who have sent a steamer to Genoa and hope to supplant English collieries in Italy do not try to furnish fuel to Belgium.

It is not alone, however, fuel which is scarce in Belgium, but other raw materials are in the same position. Mill Iron, which was selling at 85 francs a ton a month ago, cannot now be purchased for 100 francs per ton for Luxemburg quality, while Charleroi Mill Iron has, during the same time, risen from 90 to 105 francs. Scrap is also exceedingly scarce, and has risen owing to the fact that French and German rolling mills have made heavy purchases in Belgium and in Holland. Such has been the advance in the price of Old Material that it is more economical to-day to produce Iron Bar from Muck Bar than it is to make it out of Scrap. Unfortunately it requires Pig Iron to make Muck Bar and Pig Iron is scarce in Belgium. It is true that our production has considerably increased, since it has gone up from 897,808 tons for the first 11 months of 1898 to 1,114,910 tons for the corresponding period of 1899. Our imports, too, have grown, having risen from 292,066 tons during the first 11 months of 1898 to 330,489 tons this year.

Steel is also very scarce. Formerly we drew upon France and upon Germany, but both these countries are short themselves, so that they can spare us but very little.

It is a very fortunate state of affairs that in view of this rise in all raw materials the market for Finished Iron and Steel remains very firm and in excellent condition.

All our construction shops are literally overwhelmed with orders, so that it seems impossible to judge when they will be able to build the cars and the locomotives which the Belgian State railroads have decided to purchase in view of the rush of traffic. Thus far only 19 locomotives and 1300 cars have been ordered, but promises have been made to increase this within a few weeks by an eight fold number of cars and locomotives. This might give American shops an opportunity, since the Belgian State does not confine its orders to Belgian shops, which now are unable to furnish promptly for a long time to come.

Our exports, which at one time showed some falling off as compared with 1898, have recovered. The figures for the first 11 months of 1899 are 623,703 tons, as compared with 618,799 tons during the corresponding period of 1898; and so far as finished products are concerned Iron and Steel Bars are now in the very best condition. Sheets and Beams are less favorably situated. Below we give quotations in francs per metric ton:

	Decem- ber 16, 1899.	Novem- ber 16, 1899.	Decem- ber 16, 1898.
No. 3 Luxemburg Foundry Iron.....	110.00	110.00	89.00
Luxemburg Mill Iron.....	100.00	85.00	53.00
Charleroi Mill Iron.....	105.00	90.00	57.00
Thomas Pig.....	110.00	100.00	67.00
No. 2 Bars, f.o.b. Belgian stations.....	230.00	210.00	140.00
No. 3 Bars f.o.b. Belgian stations.....	235.00	215.00	145.00
No. 2 Bars, f.o.b. Antwerp.....	225.00	200.00	135.00
No. 3 Bars f.o.b. Antwerp.....	230.00	205.00	140.00
No. 2 Beams, Iron or Steel, at mill.....	210.00	205.00	140.00
No. 2 Beams, Iron or Steel, f.o.b. Antwerp.....	205.00	190.00	135.50
Angles, f.o.b. Belgian stations.....	235.00	220.00	147.50
No. 2 Iron Plates f.o.b. Antwerp.....	225.00	225.00	155.00
No. 3 Iron Plates, f.o.b. Antwerp.....	240.00	240.00	165.00
Homogeneous Iron Plates, f.o.b. Antwerp.....	260.00	260.00	180.00
No. 2 Plates, f.o.b. Belgian stations.....	225.00	225.00	160.00
No. 3 Plates, f.o.b. Belgian stations.....	240.00	240.00	170.00
Homogeneous Iron Plates, f.o.b. Belgian stations.....	260.00	260.00	200.00
Steel Plates, f.o.b. Belgian stations.....	240.00	240.00	170.00
Steel Plates, f.o.b. Antwerp.....	240.00	240.00	165.00
Sheets, f.o.b. Belgian stations.....	250.00	250.00	195.00
Steel Rails, f.o.b. Antwerp.....	160.00	160.00	120.00

New York.

Office of The Iron Age, 232-233 William street,
New York, January 17, 1900.

Pig Iron.—During the past week two interests in this market have purchased 10,000 tons in the aggregate. It is understood that the buyers are among the strongest in this section, and that some liberal concessions were made. Prices are as follows: Lehigh and Schuylkill Irons, No. 1 Foundry, \$24 to \$25; No. 2 X, \$22.50 to \$22.75; No. 2 Plain, \$21.50 to \$22, and Gray Forge, \$18.50, to \$19.25. Southern brands are quoted: No. 1 Foundry, \$22.75 to \$23; No. 2 Foundry, \$21.75 to \$22; No. 1 Soft, \$22.50 to \$22.75; No. 2 Soft, \$21.50 to \$22; No. 3 Foundry, \$21.50 to \$21.75, and Gray Forge, \$19.25 to \$20.25.

Cast Iron Pipe.—An order for about 500 tons of large sized Pipe for Syracuse has been secured by the consolidation. Other smaller contracts have been placed, and a fair number of like character are now on the market.

We continue to quote \$30 to \$30.50 for 8-inch Pipe, tide-water.

Steel Rails.—The Eastern mills do not report any sales of consequence, and the market remains \$35 for Standard Sections. We quote Angle Bars 2.40c. to 2.50c., and Spikes 2.65c. to 2.75c.

Finished Iron and Steel.—The contract for the 13,000 tons of Bridge Material for the New York Central road will probably be closed at an early date. In this city there are a number of large structures on the market, which will come out at an early date. We quote: Beams, 2.40c. to 2.50c.; Angles, 2.40c. to 2.45c.; Universal Mill plates, 2.65c. to 2.75c.; Tees, 2.40c. to 2.45c.; Channels, 2.40c. to 2.50c.; Steel Plates are 2.45c. to 2.60c. for Tank, 2.65c. to 2.75c. for Shell, 3c. to 3.10c. for Flange, 3.15c. to 3.30c. for Fire Box, 3.75c. to 4c. for Locomotive Fire Box, on dock. Charcoal Iron Plates are 3c. for C. H. No. 1, 3.50c. for Flange, and 4c. for Fire Box. Refined Bars are 2.20c. to 2.25c. and Common Bars are 2c. to 2.10c., on dock. Soft Steel Bars, 2.35c. to 2.45c.; Hoops, 2.70c. to 2.75c., base, delivered.

Merchant Pipe.—Quotations on Merchant Pipe in carloads are 50, 10 and 10 per cent. discount, delivered, and in less than carloads 50 and 10 per cent., f.o.b. maker's mill. On Casing the figures are: For carload lots, S. and S. Joint, 37½ per cent.; Inserted Joint, 32½ per cent.; for less than carload lots, S. and S. Joint, 32½ per cent., and for Inserted Joint, 27½ per cent., less 5 per cent. to jobbers, the prices for carload lots being delivered and for less than carload lots f.o.b. mill. On Boiler Tubes, 1½ to 2½ inch, the prices are 55 per cent. off on Steel and 50 per cent. on Iron; for Boiler Tubes, 2¾-inch and larger, 55 per cent. on Steel and 52½ per cent. on Iron, all subject to 5 per cent. on car lots, the prices for carload lots being delivered and on less than carload lots f.o.b. mill.

Metal Market.

Office of The Iron Age, 232-238 William street, }
New York, January 17, 1900 }

Pig Tin.—A more active market has prevailed throughout the week, and, as a result, prices have advanced slightly. Until Monday prices advanced rapidly and values soared high. A decline set in also on Monday, and, although there were material drops, prices at this writing are still half a point higher than they were a week ago. At the close to-day the metal was quoted 26¼c. to 27c. for spot, 26c. to 26½c. for January and 25¾c. to 25½c. for February. London, after having advanced to £120, closes to-day £117 10s. for spot and £117 7s. 6d. for futures. Arrivals thus far this month have been small, but the indications are that they will be heavier next week, and will foot up to about 3000 tons for the month. Deliveries so far this month have been very good.

Copper.—There has been absolutely no change in the situation. Lake is still quoted 16¼c.; Electrolytic, 16¼c., and Casting, 16¼c. It is said that the increase in both foreign and domestic demand continues, and that at the moment a good business is forthcoming from both of these quarters. London is somewhat firmer, and a better feeling prevails abroad. At the close to-day London cables named £70 15s. for spot and £70 12s. 6d. for three month's futures. Best Selected advanced 1 pound, and is quoted to-day £76 10s. The returns of Copper production for December, which we print below, show an output by domestic mines of 23,788 tons, or only 400 tons more than November. Foreign reporting mines show a production during the month of 7360 tons, which is about 500 tons less than in the preceding month. The total production, it will be seen, was practically the same for both months. The total of 15,550 tons for export shows an increase of almost 50 per cent. over last month. These figures verify the reports of a tremendous increase in demand from abroad. A large portion of this increase is traced to Great Britain and Russia, where the metal is being used for military purposes. Appended is an interesting table, showing the fluctuations during the last ten years as compiled by the New York Metal Exchange.

Pig Lead.—While the prices remain unchanged, the premium on spot has disappeared entirely, and the feeling toward the metal is a little weakish. Spot and futures are quoted 4.70c. to 4.75c., which is also quoted by the American Smelting & Refining Company. London is quoted easier at £16 5s.

Spelter.—While quiet is steady as to price and a firmer tone is said to prevail. Spot and future delivery are quoted 4.50c. to 4.60c., according to quality of brand. An increased demand has come from abroad, but no activity is felt from the galvanizing district. London has

advanced 10 shillings, and comes at the close to-day £20 15s.

Antimony.—No change has been made, and Hallett's continues to sell at 9¼c., while Cookson's is still quoted at 10¼c. to 11c.

Nickel.—Steady and unchanged at 38c.

Quicksilver.—Wholesale lots of 100 flasks and over are quoted \$51 for flasks of 76½ lbs. The London market remains unchanged at £9 12s. 6d. for Rothschild's, and £9 11s. 3d. for second hand.

Tin Plate.—The increased demand continues. Prices are unchanged. The American Tin Plate Company are quoting on a basis of \$4.84 per box of standard 100-lb. cokes, f.o.b. New York, or \$4.65 f.o.b. mill.

John Stanton reports the Copper production in the United States and of the foreign reporting mines and United States exports as follows, in gross tons of 2240 lbs.:

	Reporting mines.	Outside sources.	Total U.S. product.	Product foreign mines.	U.S. exports.
First half 1895.....	70,612	9,100	79,712	42,484	34,215
Second half 1895..	84,885	6,600	91,485	43,674	30,507
Total 1895.....	155,497	15,700	171,197	86,178	64,722
First half 1896....	94,180	7,200	101,380	42,255	58,216
Second half 1896..	95,314	7,200	102,514	43,941	67,287
Total 1896.....	199,494	14,400	203,894	86,196	125,503
First half 1897....	103,651	5,000	108,651	44,263	64,870
Second half 1897..	100,555	6,900	107,455	44,007	64,340
Total 1897.....	204,206	11,900	216,106	88,270	129,210
First half 1898....	112,687	7,900	120,487	40,880	68,234
Second half 1898..	108,535	10,250	118,785	43,674	76,831
Total 1898.....	216,222	18,050	234,272	84,554	145,115
First half 1899....	111,967	12,500	124,467	43,629	56,460
Second half 1899..	118,819	18,900	137,719	45,611	63,351
Total 1899.....	230,806	31,400	262,206	89,240	119,811

Copper Fluctuations During the Last Ten Years, Basis Spot Delivery.

	New York.	Lake.	London.	G. M. B.
	Highest.	Lowest.	Highest.	Lowest.
1899.....	19.25	13.37½	£79 5 9	£59 17 6
1898.....	13.12½	10.85	57 8 9	48 6
1897.....	12.00	10.75	51 15	47
1896.....	12.00	9.75	50 5	40 11 3
1895.....	12.80	9.25	47 8 9	38 13 9
1894.....	10.10	8.95	43	37 17 6
1893.....	12.20	9.40	46 16 3	40 12 6
1892.....	12.25	10.50	48	43 7 6
1891.....	11.60	10.25	56 10	44 1 3
1890.....	17.05	14.00	61 12 6	46 10

The New York Machinery Market.

Office of The Iron Age, 232-238 William street, }
New York, January 17, 1900 }

A quiet steady market dominated the week. There was no flurry in demand, and steady. The demand was in fact rather light, and merchants are now willing to admit that the pressure has eased up somewhat. It is stated in certain quarters that the call for the smaller sizes of tools, including lathes, drill presses and milling machines, has eased up sufficiently to bring the manufacturers pretty well abreast with current business. Some go so far as to say that certain manufacturers are known to be working on stock orders at present. We understand, however, that these are the concerns who are in the habit of carrying large stocks on hand, and who increased their capacity to keep up with last year's demand. A representative of one of these concerns said in speaking of this condition: "Our company have always followed the custom of maintaining a stock of about 50 machines. At the beginning of last year we were compelled to draw from this stock, and it disappeared within a few weeks. Throughout the greater portion of last year we were entirely unable to keep up with our orders without thinking of stock. We added a good sized building to our main machine shop, and now we're commencing to catch up. This is only as to certain smaller sizes, however."

We know of another machine tool builder who used to stock a whole floor of his machine shop with finished tools. In the midst of the business season of last year, when this floor was empty and the plant was taxed to its utmost, he set up as many tools as he needed, and "ran" this floor in connection with the other portions of his shop. There are many similar instances which might be cited. They all go to show that during the busy period the machine shops expanded. Another point which should not escape notice is that numerous comparatively small and new concerns were greatly benefited by the activity of last year. They have been placed in a position to compete with older concerns when a falling off of business is felt. In short, there has been an increase in production, and this fact may tend to hasten the day when an easing up tendency will be prevalent.

There have been no evidences as yet of the dropping

of any of the plums which have hung just beyond reach so long. Only one fair sized deal is reported. The New York Air Compressor Company purchased a number of lathes, milling machines and boring mills to augment their new equipment at Arlington, N. J. This company also purchased a full equipment of wood working tools for a new pattern shop. They have just received an order for six large compressors, and have so much work on hand that they are arranging to double the equipment of their new shops. Their offices are at 120 Liberty street. Wm. Pressenger, secretary of the company, is purchasing the new machinery.

John S. Griggs of 99 Cedar street has just purchased part of the equipment for a novel power plant, to be installed by the Curtis Publishing Company of Philadelphia. The plant will be approximately 1000 horse-power. The contract for the boilers was awarded to the Babcock & Wilcox Company. The Harrisburg Foundry & Machine Company will furnish the engines. Westinghouse generators and motors, Goulds and Worthington pumps and Hoe and Cottrell presses have been ordered. A contract was also placed with the Fuel Economizer Company of 74 Cortlandt street, and Matteawan, N. Y., for a fuel economizer plant. Mr. Griggs is now purchasing other apparatus auxiliary to the plant. He is also in the market for a number of power pumps, which are to be installed at the Queens County refinery of the Standard Oil Company.

E. V. Hotchkiss, who is in this country representing Adolph Janssens of Paris, is said to be placing good sized orders for machine tools. It is said that the tools are to be placed principally in the warerooms of Mr. Janssens at his Brussels branch. Mr. Hotchkiss is stopping at the Hotel Imperial, New York.

Other good sized purchases are being made in this market by an Italian machinery firm, who were recently represented here by an engineer of the firm. Inquiries which this company are sending to the trade call for tools in batches of 10 and 12. The machinery, it is said, is for equipping an Italian railroad and locomotive shop.

We are also informed that F. H. Armstrong, who is in this country representing Dick, Kerr & Co., Limited, of London, is making additional purchases of machinery for the new plant which that company are building for the English Electrical Mfg. Company at Preston.

Among some of the recent orders for the machinery equipment of the marine shops of the Chinese Eastern Railroad, to be established at Port Arthur, are included bending rolls, which the Cleveland Punch & Shear Company will furnish, and a number of heavy tools which were purchased from Hilles & Jones of Wilmington.

The plant of the Breda Iron Works has been acquired by La Societa Italiana Ernesto Breda, which company were recently incorporated in Milan, Italy, with a capital of £2,000,000. The new company will build locomotives and railroad equipment. It will be recalled that one of the engineers of the company visited this country recently. The company are said to be doing a large business, one of the recent orders which they received being for 20 compound locomotives.

H. A. Freeman, formerly connected with the Chicago house of the Ashton Valve Company, has been appointed assistant manager of the New York branch of the same company, located at 121 Liberty street. Mr. Freeman's experience in the past as a practical mechanic, engineer and salesman makes him well fitted to cater to the trade among the stationary engineers, which department he will have charge of in the New York territory.

The Association of Malleable Iron Manufacturers met in Pittsburgh last week. No statement was given out as to what action was taken at the meeting, but it is understood that a revised form of price-list was adopted.

The case of the Wheeling Bridge Company vs. W. P. Hubbard, John M. Sweeney of Wheeling and W. D. Uptegraff of Pittsburgh, which has been pending in court for several years, has been decided in favor of the defendants. The plaintiffs claimed that there had been fraud in letting the contract for its bridges to Ferris & Kaufmann, and claimed \$120,000 damages.

The Pittsburgh Locomotive Works, Pittsburgh, Pa., have established an office at 26 Victoria street, Westminster, London.

E. A. Ormsby, Melrose, Mass., has just put his apparatus for operating monitor roof and transom windows into the works of the Norwalk Iron Works Company, South Norwalk, Conn.

The James Clark Leather Company of St. Louis, Mo., have inaugurated the profit-sharing system with their employees.

OBITUARY.

JOSEPH JOHNSTON.

Joseph Johnston, master mechanic of the Bethlehem Steel Company, died at Bethlehem, Pa., January 2, aged 72 years. He was a native of Scotland, but came to this country many years ago.

ORANGE NOBLE.

Orange Noble, a member of the firm of Rawls, Noble & Co., who built the Erie Furnace in 1869, died at Erie, Pa., on December 30, aged 82 years.

CHARLES REUTER.

Charles Reuter, senior member of the firm of Charles Reuter, Son & Co., machinery and railroad supplies, Baltimore, Md., died suddenly on January 7, at his home in that city, aged 59 years. Mr. Reuter was born in Baltimore, and at an early age became a partner in the firm of Charles E. Inloes & Co., in the machinery business. Later he formed the firm of Reuter & Mallory, which he left about a year ago, founding the firm of Charles Reuter, Son & Co.

THOMAS EGLESTON, LL.D.

Prof. Thomas Eggleston, LL.D., founder of the School of Mines of Columbia University, New York, and for 33 years professor of mineralogy and metallurgy in that institution, died on January 15 at his home in New York City from a complication of diseases. Thomas Eggleston was born in New York City on December 9, 1832, and was graduated from Yale, where he took a course in chemistry, in 1854. He afterward went abroad and attended lectures on geology and chemistry in Paris. In 1860 he was graduated from the Ecole des Mines in that city. Returning home in 1861, Mr. Eggleston was appointed to the charge of the mineralogical collections and laboratory of the Smithsonian Institute at Washington. After spending two years at Washington he conceived the idea of a School of Mines, and the project was adopted by Columbia College, the school being started in 1864, with Mr. Eggleston as professor of mineralogy and metallurgy. This position he retained until two years ago, when failing health compelled him to relinquish its active duties, although continuing as professor emeritus. Professor Eggleston was one of the founders of the American Institute of Mining Engineers, and was at one time its president. He was also one of the founders of the American Meteorological Society, and of the Societies of Mechanical Engineers and of Electrical Engineers. He was a member of the Society of Civil Engineers and of the Iron and Steel Institute of Great Britain. He was also active in many other scientific societies. In 1868 Professor Eggleston was appointed a United States Commissioner to examine the fortifications of the coast, and in 1873 he was one of the jurors of the International Exposition at Vienna. The degrees of Ph.D. and LL.D. were conferred upon him in 1874 by Princeton and Trinity Colleges respectively. The Government of France made him a Chevalier of the Legion of Honor in 1890, and gave him the rank of "Officer" in 1895. Professor Eggleston published a great number of books and pamphlets on scientific subjects.

Tests will shortly be made at the Sandy Hook proving grounds of the new 10-inch Brown segmental wire gun, which is believed to be the most powerful piece of ordnance ever built in this country. Estimates based on experiments made last summer with a 5-inch gun of the Brown pattern indicate that the new piece will fire the standard projectile, weighing 575 pounds, at a velocity of 3000 feet a second, and that it will pierce the heaviest armor. The core of the gun is made up of 282 finely tempered steel segments, each less than ¼ inch thick and 37 feet long, around which 75 miles of square rolled high tension wire are wound.

According to a Chicago press dispatch plans for the expenditure of \$25,000,000 in improving the physical condition of the Baltimore & Ohio Railroad have been completed, and within the next three years that amount of money will have been expended. Improvements of roadbeds, bridges, tracks and equipment will be made on all lines of the system.

United States Minister Loomis at Caracas has informed the State Department that the Venezuelan Government has abolished the law increasing the import duties 20 per cent., also the decrees of last year imposing duties on foreign goods according to the tariff which was in force until August 31, 1899.

QUOTATIONS OF IRON STOCKS DURING THE WEEK ENDING JANUARY 17, 1900.

Cap'l Issued.		Sales.	Thursday.	Friday.	Saturday.	Monday.	Tuesday.	Wednesday
\$20,000,000	Am. Car & Foundry, Common..	3,185	.....	.....	13 -13½	12½-13	-13	13 -13½
20,000,000	Am. Car & Fy, Pref. (7½ Non-Cu.)	495	-60	.....	.....	59½-60	.....	.....
19,000,000	Am. Steel Hoop, Common.....	300	-42	.....	.....	.....	.....	-41½
14,000,000	Am. Steel Hoop, Pref. (7½ Cu.)..	100	.....	.....	.....	.....	.....	-81
50,000,000	Am. S. & W., Common.....	62,415	46½-48½	46½-48	47½-48½	45½-47½	45½-46½	46½-47½
40,000,000	Am. S. & W., Pref. (7½ Cu.)....	1,575	.....	89½-90	-90	89 -90½	.....	.....
28,000,000	Am. Tin Plate, Common, N. Y..	5,075	29 -20½	30 -30½	30½-30½	28½-29½	-29½	28½-30½
18,000,000	Am. Tin Plate, Pref., N. Y. (7½ Cu.)	100	.....	1 -80½	.....	.....	.....	.....
7,500,000	Bethlehem Iron+.....	.....	.....	.....	.....	.....	.....	.....
15,000,000	Beth. Steel, Par \$50, \$1 paid in.	.....	.....	.....	.....	.....	.....	.....
7,974,550	Cambria Iron, Phila*.....	577	-45	-45	-45	-45½	45 -45½	.....
16,000,000	Cambria Steel**.....	12,110	21½-21½	20½-21½	21½-21½	20½-21½	20½-21½	21½-21½
11,000,000	Col. Fuel and Iron.....	8,210	40½-42½	41½-42½	43 -43½	41½-42½	43 -44½	43 -44½
46,484,300	Federal Steel, Common.....	53,838	47½-50½	49½-50½	51 -52	49 -51	49½-50½	49½-50½
53,253,500	Federal Steel, Pref. (6½ Non-Cu.)	3,963	71½-72½	73 -73½	74 -74½	72½-73½	-73	73 -73½
32,000,000	National Steel, Common, N. Y..	2,540	41 -41½	41½-41½	42 -42½	41½-42½	41 -41½	-41½
27,000,000	Nat'l Steel, Pref., N. Y. (7½ Cu.)	70½	-92½	.....	.....	-92½	-92½	-92½
5,000,000	Penna., Common, Phila.....	.....	.....	.....	.....	.....	.....	.....
1,500,000	Penna., Pref., Phila.....	.....	.....	.....	.....	-89	.....	.....
12,500,000	Pressed Steel, Common.....	3,440	57 -57½	57 -57½	57½-58½	58 -58½	58½-58½	58½-58½
12,500,000	Pressed Steel, Pref. (7½ Non-Cu.)	1,550	.....	-86	.....	.....	87 -88	88½-88½
27,352,000	Republic Iron & Steel, Common.	5,745	20½-21½	20½-21½	20½-21	19½-20½	.....	20 -20½
20,852,000	Repub. Iron & Steel, Pref. (7½ Cu.)	200	-65	.....	.....	.....	.....	-65
20,000,000	Tennessee Coal and Iron.....	8,985	79½-83	81 -83½	84 -85½	82 -84½	82½-84	83½-84½
1,500,000	Warwick Iron & Steel (par \$10)	1,521	.....	-10½	.....	10½-10½	-10½	-10½

* Par \$50. ** \$1.50 per share paid in. † 6 % guaranteed by Beth. Steel Co. Late Philadelphia sales by telegraph. ‡ Ex-dividend.

Bonded Indebtedness: Am. S. & W., \$130,656; Am. Tin Plate, none; Am. Steel Hoop, none; Cambria Iron Co., \$2,000,000 6 % debenture 20-year bonds, 1917, payable option 5 years, assumed by Cambria Steel Co.; Federal Steel Co., \$13,200,000 Illinois 5 % \$7,417,000 R. J. E. R. R. 5 % \$1,600,000 Johnson 6 % \$6,732,000 D. & I. R. R. 5 % \$1,000,000 2d D. & I. R. R. 6 % \$10,000 land grant D. & I. R. R. 5 %; National Steel, \$2,561,000 6 %; Tennessee C. I. & R. Co., \$3,367,000 6 % \$1,114,000 7 % \$1,000,000 7 % cu pref.; Pennsylvania Steel, \$1,000,000 5 % Steelton 1st 1917, \$2,000,000 5 % Sparrow's Point 1st 1922, \$4,000,000 consolidated, both plants; Bethlehem Iron, \$1,351,000 5 % maturing 1907. Interest and principal guaranteed by Bethlehem Steel Co. Republic Iron & Steel, none; Warwick Iron & Steel, none; Colorado Fuel & Iron Co., Col. Fuel Co. Gen. Mort. 6 % \$380,000, Col. Coal & Iron Con. Mort. 6 % \$2,810,000, Col. Fuel & Iron Gen. Mort. 5 % \$2,303,000. Also outstanding \$2,000,000 preferred stock with accumulated dividends of \$640,000 to June 30, 1899.

Iron and Industrial Stocks.

In sympathy with the speculative markets generally steel stocks have had a quiet week. The markets have held pretty steady. Outside interest is limited, while holders of the stocks are not willing to sell at present prices. Gradually official reports are coming in, relative to the earnings of some of the consolidations. In some cases they are somewhat disappointing.

	Bid.	Asked.
American Bicycle Co., common.....	45	50
American Bicycle Co., preferred.....	91½	92½
American Bicycle Co., bonds.....	132	.....
E. W. Bliss, common.....	125	.....
E. W. Bliss, preferred.....	125	.....
Diamond State Steel.....	5½	5¾
International Silver, common.....	8½	9½
International Pump, common.....	15½	17
International Pump, preferred.....	63	65
National Tube, common.....	42	44
National Tube, preferred.....	92	98
Otis Elevator, common.....	20	24
Otis Elevator, preferred.....	86	89
U. S. Projectile.....	95	100
Sloss & Sheffield Steel & Iron, common.....	28	30
Sloss & Sheffield Steel & Iron, preferred.....	67	69
Tidewater Steel.....	13½	13¾
U. S. Cast Iron Pipe Co., common.....	8	10
U. S. Cast Iron Pipe Co., preferred.....	41	42
H. R. Worthington, preferred.....	103	106

The Cambria Steel Company have declared a quarterly dividend of 50 cents per share, payable February 15 to stock of record January 31. An assessment of \$1.50 per share, payable February 1 on stock of record January 31, has been called and an extra dividend of \$1.50 per share has been declared, payable only for the purpose of enabling stockholders to meet the assessment.

At the meeting of the Cambria Steel Company the following directors were elected: Josiah M. Bacon, Robert F. Kennedy, Charles S. Price, David Reeves, Powell Stackhouse, Edward T. Statesbury, John W. Townsend, John Lowber Welch, R. Francis Wood. The net earnings for the year are equal to \$6.25 per share; \$1,333,000 was spent and charged up to permanent improvements. The balance sheet gave assets of \$6,036,532 in which stock and materials figured at \$2,346,653. Bills receivable were \$2,467,828 and bills payable \$1,051,000.

At a meeting of the stockholders of the New Haven and Susquehanna companies to consider the Atlantic Iron & Steel proposition the statement was made that the Susquehanna Company had earned \$85,000 in excess over the dividend in each of the two quarters, and that the company had \$120,000 in cash in hand after paying for a site for the tube plant at Columbia, Pa. So far as the New Haven Company are concerned, it was reported that in 121 days the net profits were \$685 per day, and that after paying \$50,000 in dividends, \$315,104 was added to the surplus account.

Officers and counsel of the New York & New Jersey Bridge Company appeared before the Commissioners of the Sinking Fund of New York last Tuesday with a proposition asking for a franchise for the construction of a double track railroad along West street from Battery

Park to connect at Fifty-ninth street with the proposed bridge over the Hudson River. The plan provides that the company are to incorporate with a capital stock of \$85,000,000. If the franchise asked for is granted the company offer to turn the structure over to the city at the end of 100 years, or as soon as the profits of the operation had repaid to the company the \$85,000,000 of stock and bonds to be issued. The matter was referred to the Comptroller and president of the Council with instructions to report in a month.

Under the will of the late Dorman B. Eaton of New York, the noted advocate of municipal reform, \$100,000 each is bequeathed to Columbia and Harvard Universities for the support of chairs of the science of government at those institutions.

Application for a franchise to construct a tunnel from West Broadway and Chambers street, New York, west under the Hudson River to Jersey City was presented before the Municipal Council of New York last Tuesday by the Manhattan Tunnel Railway Company. A public hearing was fixed for February 9.

The railroad earnings for the calendar year 1899, as computed by *Bradstreet's*, show a gain of fully 10 per cent. over those of the preceding year. The granger roads were foremost in the proportion of gains, with an increase over 1898 of 11.9 per cent.; the coal roads reported an increase of 11.5 per cent., the Southern roads of 10.4 per cent. and the Pacific roads of 10.1 per cent., while the trunk lines reported 9.8 per cent. increase and the Central Western roads 8.8 per cent. Like every other department of business, the transportation interests in the year 1899 set up new standards by which future operations will be measured.

The record of railroad receiverships during the year 1899 showed a gratifying diminution. Only ten roads passed under the care of the courts, with an aggregate mileage of 1019 miles, as compared with 18 roads, with over 2000 miles of track, in 1898. The aggregate capital involved last year was \$52,000,000, as against \$138,000,000 in 1898. Moreover, the receivership record of last year includes only one large system, the Kansas City, Pittsburgh & Gulf, which contributed 782 miles and \$42,000,000 capitalization to the total. Apart from this one road, those which succumbed last year were relatively small and unimportant interests.

A plebiscite of the citizens of the Mexican Republic made on January 1 favored by an immense majority the candidacy of President Diaz for re-election to the presidency for the term beginning next December.

Plans are being completed for the utilization of the Cob Dock in the Brooklyn Navy Yard as coal pockets. This will make it the largest coaling station in the North Atlantic.

Trade Publications.

Iron and Steel Products.—The Republic Iron & Steel Company, Chicago, have issued a dainty brochure, which sets forth the advantages possessed by that company in the possession or ownership of raw materials, the facilities for their conversion and the appliances for turning out finished products. They own iron ore mines on the Mesaba and Marquette ranges, coking coal lands in the Connellsville region and iron ore, coal and limestone properties in Alabama. Their Pioneer property in Alabama comprises 26,000 acres, of which 14,000 acres are underlaid with coal and 10,000 acres with ore. They have six blast furnaces in operation and one building, two open hearth steel plants in operation, a Bessemer steel plant building and 30 rolling mills in operation at various points in Pennsylvania, Ohio, Kentucky, Indiana, Illinois, Minnesota and Alabama. Their finished products are merchant bar iron and steel, sheets, plates, spikes, bolts, nuts, axles, turn buckles, &c. From May 1, 1899, when they began operations, to January 1, 1900, the company turned out 502,184 gross tons of iron ore, 87,684 net tons of coal, 112,486 net tons of coke, 265,682 gross tons of pig iron, 279,662 gross tons of muck bar, 16,023 gross tons of steel ingots and 525,951 net tons of finished material of all kinds.

The Farwell Milling Machine.—A catalogue has just been issued by the Adams Company, Dubuque, Iowa, setting forth the special features of the Farwell milling machine, which is designed to be combined with an iron planer. The advantages of this tool are fully set forth, numerous illustrations being given of the manner in which it can be applied and the character of the work done with it. These illustrations are a prominent feature of the catalogue, being unusually well executed.

The Farwell Molding Machines.—The Adams Company, Dubuque, Iowa, are distributing a fine catalogue describing and illustrating their Farwell molding machines. These machines comprise quite a variety of constructions intended for different classes of work. The Farwell molding press is a machine which is now in operation in many of the leading foundries of the country. It is very quickly operated, one motion bringing the top in position and pressing the mold. All working parts are above the sand, and are not subjected to the wear which machines of a different class receive. With this press a 135-pound man will exert a pressure of 2 tons upon the mold with little muscular effort. The press has an adjustable horizontal lever, and the operator simply stiffens his arm and leans his weight upon the lever. Molds as large as 18 x 22 or 16 x 24 inches can be pressed with ease. The Farwell universal molding machine may be used as a combined molding press and stripping plate machine, as a combined molding press and flask lifter without stripping plate, or as a plain molding press. One size of machine is adapted for any size or shape of mold, either single or duplex, containing not more than 400 square inches of surface. Either iron flasks or snap flasks may be used. Several jobs may be run on the same machine in a day without waste of time in adjustment. The Farwell automatic molding machine is designed to make a complete snap mold. By a few rapid and easy motions of the operator the machine is made to support the flask and admit the pattern plate, turn the flask over, and, after sand has been riddled and shoveled into the drop, to peen the drag, clamp on the bottom board, turn over peen and press the cope, cut all sprue holes or draw flat gate, separate the mold, draw the pattern, close the mold, and remove the finished mold from the flask, leaving it ready to be placed upon the floor. The flask may be of any shape, to either straight or irregular parting, and any size not to exceed 16 x 22 inches. The system of manufacturing multiple molds is fully illustrated and described. Illustrations are also given showing a great variety of patterns used on the Farwell machines. The catalogue ends with addresses of a number of prominent foundries ordering presses on trial who followed the trial order with purchases of machines for regular work.

The Row Tube.—The Heat Transmission Company of Danbury, Conn., are introducing in this country the Row patent tube, an English invention, which has been rapidly developed abroad during the past two years. The Row tube is formed by indenting a circular tube in a regular manner and thus securing a considerable increase in the heat transmitting property, as compared with a plain round tube. This forms the basis of designs of a series of types of feed water heaters, feed water interheaters, reheaters, evaporators and fresh wa-

ter condensers, calorifiers, steam kettles, gas kettles, radiators and steam traps.

Inspirators.—The Hancock Inspirator Company of Boston have issued their 1900 catalogue descriptive of the different types of inspirators, injectors, steam valves, check valves, hose strainers, boiler washers, jet pumps, the Loftus restarting injector, the Hancock hydrocarbon burner, the Hancock "purge apparatus," and the Hancock shaking grate with water tubes.

Roofing and Siding.—The Cincinnati Corrugating Company of Piqua, Ohio, operating their own rolling mills, galvanizing works, tin plate works and steel roofing and kindred articles departments, have issued a very handsome catalogue, comprising very nearly 100 pages, 6 x 9 inches in size, substantially bound in flexible linen covers embossed in gold. Under the title, "What We Make," are enumerated some 29 different specialties, including corrugated roofing, siding, ceiling "V" crimp, standing seam, and other sheet metal roof coverings, galvanized sheets, black sheets, eave trough, conductor pipe, hangers, shoes, elbows, &c., corrugated arches, shutters, doors, &c., which are excellently shown up in the body of the work by means of over 100 finely executed engravings. The work is subdivided into four divisions—viz.: Corrugated iron, plain roofing department, metal siding department, conductor pipe, eaves trough and roof trimmings department. The entire work is supplemented with an alphabetical index to contents, a very convenient feature of reference in so comprehensive a work, and much other information relating to sheet metal roof coverings is published in the catalogue of great value to dealers or purchasers.

PERSONAL.

John R. Phillips, formerly manager of the Laughlin Works of the American Tin Plate Company, at Martin's Ferry, Ohio, has been appointed by the American Tin Plate Company manager of the Pittsburgh district. Mr. Phillips takes the position vacated by John C. Oliver, who resigned a couple of weeks ago to connect himself with the Oliver Iron & Steel Company of Pittsburgh.

It is announced that William H. Gibbons, president, and George Thomas, 3d, treasurer, of the Parkersburg Iron Company, have resigned. Horace A. Beale, Jr., succeeds to the presidency of the company. Mr. Gibbons will retire from business.

Brown Caldwell, recently secretary of the Peerless Rubber Company, has assumed the position of general Eastern representative of the Sargent Company of Chicago, and will have offices in Pittsburgh and New York City.

The New York Air Compressor Company's new shops at Arlington, N. J., commenced operation in all departments but the foundry upon January 2, and the company expect to have their foundry at work by February 1. Although organized but a little over 60 days, the sales record of this company is remarkable, orders having been placed with them sufficient to tax their capacity for three months. Plans have been made to double the shop equipment at once, and the plant will be operated day and night until this is done.

James Cooper, lately superintendent of the Foos Gas Engine Company, Springfield, Ohio, has accepted the position of assistant superintendent of the Fairbanks & Morse Gas Engine Company, New York.

W. S. Shelow has succeeded W. J. Sleep as manager of the American Pig Iron Storage Warrant Company's yards at Birmingham, Ala.

J. Vaughan Merrick of Philadelphia has presented to the University of Pennsylvania funds sufficient for the purchase of air pump and jet condenser, indicators, water power engine, milling machinery, alternating current volt and ammeters and other apparatus for mechanical and electrical engineering laboratory work.

W. W. Willson has been appointed superintendent of the American Steel Hoop Company's mill at Warren, Ohio.

W. H. Gibbons has resigned the presidency of the Parkersburg Iron Company at Parkersburg, Pa., and Geo. Thomas, 3d, has also resigned the treasurer'ship of the same company. Mr. Gibbons has been connected with the company during the past 24 years and retires to take a well earned rest. The new officers have all been long connected with the business and are as follows: H. A. Beale, Jr., president; A. J. Williams, vice-president; E. H. Broadhead, treasurer.

New Publications.

FIRE PROOFING OF STEEL BUILDINGS. By J. K. Freitag. 8vo, 319 pp., illustrated. Published by John Wiley & Sons. Price, \$2.50.

The author first considers the development of fire proofing methods and steel building construction, the earliest application of the present general system of fire resisting design being the use of the brick arch sprung between iron beams. The employment of wrought iron beams permitted a reduction of the distance between the walls to any desirable span, so that the deep and heavy brick arches could be made thinner and therefore lighter. The depth was finally reduced to one course of brick, which brought the weight down to about 33 to 35 pounds per square foot when set, to which was added a concrete filling of varying depth but averaging 8 to 10 pounds to each inch in thickness. In the earlier buildings the interiors were formed of cast iron columns, iron girders and iron floor beams carrying the brick arches. This left the lower flanges of the beams entirely exposed to the possible action of fire. An attempt to reduce the cost and dead weight of the brick arch method led to the introduction of the arch in which sheets of corrugated iron, curved, were sprung between the lower flanges of the I-beams.

The present systems of fire proofing resulted practically from the great Chicago fire in 1871. Flat hollow tile arches were introduced in Chicago in 1872, and shortly after in New York. These arches proved substantial, and served well the purpose of a light fire resisting floor. Previous to the year 1883 all of the tile arches used in Chicago had been made of tiles without interior webs except in the skewbacks. It was found that these tiles were not strong enough to sustain heavy loads, and the interior webs were introduced first in the building of the Mutual Life Insurance Company in New York. This type of arch was also used in the Home Insurance Company's building, Chicago, in 1883-1884, which was the first skeleton construction building erected.

At first iron was considered to be a fire proof material, and in the earlier constructions was not protected. The first attempt to protect the columns against fire was through the use of a double shell, one within the other, the intervening space being filled with plaster. The plaster was afterward abandoned and dependence placed upon the air space between the two casings. After 1886 architects generally began to specify iron columns to be incased in terra cotta blocks, and many of the present forms came into immediate use.

The author states that while mill construction undoubtedly possesses some decided advantages the accepted methods of "slow burning" construction have not been sufficiently "slow burning" in practice to warrant the extended use of the system. The objections to the use of this construction lie in the general employment of pitch pine for the longer and heavier timbers required in the system. This timber, when once ignited, makes a hotter and fiercer fire than even the light joists and lathing of non-fire proofing construction.

The results of tests of the well-known forms of fire proof floors are presented in such form as to be of the greatest value from the standpoints of the owner, architect, builder and underwriter.

The materials usually employed in fire proof building construction are cast iron, wrought iron, steel, stone, brick, terra cotta, mortars, plasters and concrete. It is stated that unprotected cast iron can stand practically unharmed in temperatures from 1300 to 1500 degrees F. while carrying heavy loads, while wrought iron or steel will commence to yield at temperatures from 1000 to 1200 degrees. The results of tests showing what we may term the yielding point due to heating are presented. Stone under the action of severe heat will crack or calcine, according to its nature, and should therefore be most cautiously used in fire proof construction. The fire resisting qualities of brick and terra cotta are well known. Experiments made in Hamburg, Germany, on different mixtures of concrete showed that 1 part cement to 7 parts coarse clinders gave the best results. Fire was applied to this cement for three and three-quarter hours, when one sample was cooled suddenly and one slowly, but neither suffered under the test.

Chapter six considers the permanency of modern design, the effect of corrosion and the methods of guarding against corrosion. The next division deals with the design of successful fire proof buildings, the essential points of which are enumerated as follows: The fire resisting detail of all structural portions of the building, adequate equipment to cope with either exterior or interior fires, and the proper planning of the general features.

This is followed by descriptions of floors of different types, methods of protecting floor beams and columns

of different section and material. The author states that the present methods of so-called fire proof partition construction undoubtedly constitute the weakest feature in modern fire resisting design. An inspection of these partitions will reveal the fact that one of the most important functions has been overlooked—namely, the fire retarding quality. To fully meet the requirements these partitions should be fire resisting to such an extent as to limit the spread of fire, should possess heat retarding qualities, should have stability against shock, water streams, &c., and should have deadening qualities to prevent the transmission of sound. These are of the utmost importance, since the confining of a fire depends upon the integrity of the partitions. The usual methods of partition construction are described and a comparison presented of their various good and bad features.

The final chapters of the book treat of the exterior of the buildings, wall and roof, and the equipment to be provided for dealing with a fire.

The book is well arranged, the descriptive matter clear and concise, and there is a copious index. The entire subject has been admirably handled, and the data set forth should be of the greatest value to both the architect and owner.

COPPER MANUAL. Volume II. By D. Houston & Co., Metal Brokers, New York. Published by D. Houston & Co. Price \$3.

Late in 1897 Houston & Co. issued a neat little book in which there was collected a good deal of information relating to copper and copper mining enterprises. Now the same authors have come forward with a far more ambitious and interesting volume. Descriptions with handsome illustrations are given of practically every important mining enterprise in the United States, and some of those of foreign countries. In this manner a good deal of information has been collected of a semi-official and official character, which will be valued by all who are interested in the metal as producers or as consumers. Throughout the book there are scattered a good many tables of statistics and of prices, and we notice also lists of some of the fortunate holders of Calumet & Hecla and other leading copper stocks. The equipment of the book in printing, binding and illustrations is very handsome.

BENNER'S PROPHECIES. By Samuel Benner. Thirteenth edition. Published by the Robert Clarke Company, Cincinnati, Ohio. Price \$1.

Another edition has been printed of Benner's well known prophecies, the work having remained practically unchanged for a series of years. The only addition is his forecast for 1900, a few pages. Mr. Benner was not particularly lucky in his guess for 1899 and he may be more fortunate in his prediction for 1900, which is to the effect that prices for pig iron and many other commodities will incline downward. Mr. Benner himself is now urging "some enthusiastic and ambitious person" to take up his work, since ill health has caused his spirit of prophecy to nearly depart. However, there is only one Benner, and the hope that there can ever be a successor seems to us to rest upon expectations very remote.

SEEGER & GUERNSEY'S CYCLOPEDIA. Published by the United States Industrial Publishing Company, New York.

This is a new edition of a directory of the manufacturers of the United States, grouped according to articles. We have looked over some of the lines with which we are familiar and cannot help expressing our amazement at the number of inaccuracies with which the book is crowded. So far as we can discover the compiler has not heard of a single one of the consolidations which have been formed in the iron trade during the past year, even those which are now nearly a year old being entirely ignored. To judge from the lists the compiler is not even familiar with Swank's Directory, since there are glaring mistakes which even the most casual reference to that work would have corrected. If the rest of the book is as wretchedly done its value is very low.

The Colonial Coke Company have been granted a charter of incorporation. The principal stockholders are W. H. Warner, formerly of the Warner Coal Company, and Henry B. Shields of Mattie Furnace, at Girard, Ohio. It is understood that the new concern have acquired considerable acreage of coal lands on the line of the Pennsylvania Railroad, and the building of 100 coke ovens has already been commenced. Much of the product will be used by Mattie Furnace, owned by the Girard Iron Company, at Girard, Ohio.

HARDWARE.

Condition of Trade.

THERE are few changes in prices to note. The volume of business increases somewhat as the month advances. Jobbers are finding orders coming in quite freely, indicating a good condition of business with the trade throughout the country. The purchases are for the most part to complete assortments, the stocks of many goods in retailers' hands being ample for early requirements. There is little speculative buying on the part of either jobbers or retailers, and the jobbers especially are generally adhering to the policy deliberately adopted by many of them to market stocks in hand or under contract before entering liberal orders at the prices now ruling. This policy is not to be regarded as resulting from a conviction that there is to be an early or radical break in the market, for most of them take a decidedly cheerful view of the outlook, anticipating that the volume of business will be large and prices probably well maintained for some time. They, however, consider it a matter of prudence to realize the handsome profits which goods in their warehouses will yield them if marketed under existing conditions. When the goods are disposed of they can act intelligently in view of the situation as it then presents itself. In this way they will be sure, assuming that the goods are both sold and paid for, of a satisfactory outcome of the present condition, which may be imperiled if high priced goods are held too long, or the policy of buying speculatively be carried too far. Careful and intelligent retail merchants are regarding the matter in a similar light and are conducting their business so as not to be caught with heavy stocks of high priced goods when the reaction sets in. Their business generally is, however, so good that Hardware is moving freely and a profitable trade is being carried on. The high prices of certain lines are doubtless interfering somewhat with consumption, and enterprises are in many cases being deferred in view of increased costs of materials and supplies. During the past week there have been few important changes in price, the tone of the market continuing decidedly firm. In a good many lines manufacturers are apparently desirous of booking orders, and in some instances slight concessions are made. In most lines, however, manufacturers are adhering firmly to quotations and are guarded in the acceptance of orders for future delivery. Collections are excellent, and the outlook for a large business is very promising.

Chicago.

(By Telegraph.)

Shelf Hardware jobbers are having a wonderful trade for January. It is of a very different character from that reported in January of last year. Retail merchants were then placing orders freely because prices were advancing, and they desired to anticipate high prices as much as possible. This year they are not fearing further advances, but are buying just as freely, which indicates that their trade demands the goods. This is a healthy condition of business. The orders being received are covering almost the entire line of Shelf Hardware, and to a great extent include Mechanics' tools and other expensive goods. Some orders are also being

made in the Hardware trade, even if stocks have to be laid in at the present high level of prices. Jobbers are further making large shipments of spring goods, which are being taken now by the retail trade in order to make certain of having the goods when they will be needed. Buyers have been taught caution in this respect by the experience of several seasons past in finding manufacturers unable to meet the demand as the season approaches. The movement of Sheet Metals, Tanners' Stock, Tinware, House Furnishing Goods, &c., is also much better than usual this month. The outlook is certainly very encouraging for all branches of the Hardware trade. Heavy Hardware jobbers speak fully as well of their trade. They estimate the volume of business as equal to that of early in December. They report manufacturing freely in preparation for the spring trade.

St. Louis.

(By Telegraph.)

No unusual features present themselves, and for season, and following holidays closely, volume of business is good. Salesmen are again taking the road, with every prospect of successful trips. The number of new stock orders is spoken of as unusually large when it is remembered that high prices are generally supposed to check new enterprises. Authorities differ as to extent of new buildings and improvements to be undertaken this year, but very strong opinions are given that Builders' Hardware will be in active demand. Outdoor work has gone on almost uninterruptedly in this territory, due to favorable weather, and Nails and Builders' Hardware in consequence have been in good movement. Corrugated Sheets and Stamped Ceilings and Sidings are in better sale than for same period last year. Wood Saw Frames have advanced, and it is claimed through scarcity of hardwood brought about by indisposition of farmers to cut choice timber until forced to by prospect of poor crops. Unexpected activity is reported among trappers, to which a shortage of Steel Traps is attributed.

Boston.

BIGELOW & DOWSE COMPANY.—We do not expect a large volume of business in January, but if the increase in sales this year is a criterion of what we are to expect in the months to follow the trade will be very happy.

We are having the snow and ice in January that failed to make its appearance earlier. The backward season interfered materially with the sale of Skates and Sleds, Snow Shovels and other kindred goods. Unless the season is favorable before Christmas it is useless to look for it after. Our mills are all running full time, and labor is well employed at wages already advanced from 10 to 20 per cent.

Every indication now points to a larger volume of business in 1900 than in 1899.

Stock taking is in order, and plans are being formed for the spring campaign.

Everything looks bright and prosperous. Merchants have settled or have to settle how they are to price their stocks, whether at present values or cost or a medium value between cost and present cost.

The only good reason for not pricing stock at present cost is a conservative feeling that they should not take profit until the goods are sold.

Why not take stock at present cost and create a contingent profit account, and place to its credit any amount one's conscience will not allow should go to actual profit?

Is it not best to have the actual value in case of fire? Will it not enable a house to get better profit to have the actual stock costs on present values?

Baltimore.

CARLIN & FULTON.—The business of the new year has opened comparatively well, and while the contrast between the prices of to-day and those of a year ago is most decided, we think, with some exceptions, the demand for goods is going to be as great. We must not forget, however, in making our estimates for the trade of the coming season, that business last spring was greatly stimulated by the speculative interest in the market, and that now the demand for goods will represent more truly the legitimate need or actual consumption of the country.

As to prices there seems to be not the least concession, and though it would be only a natural supposition that prices had now about reached their highest level, the last advance in Wire Nails proves the contrary and may be but the forerunner of other advances in similar lines, such as Cut Nails and all products of Wire.

It is also noticeable that as many of the manufacturers of the smaller wares which had not advanced in proportion to the heavy staples are figuring on the cost of raw material for their year's production, they are realizing the necessity of somewhat higher prices on many articles to keep pace with the enhanced cost of manufacture, and revisions of lists and changes of discount are matters of every day occurrence.

We see no reason why the retailer should not buy for his legitimate wants with perfect confidence in the stability of the market for the present year at least, especially as the consumption of goods in every section promises to be greater than ever before.

St. Paul.

FARWELL, OZMUN, KIRK & Co.—The inventory season has passed, the results of last year's business have been placed on the books and the new year's work has begun. A short season of rest has been afforded to the traveling salesmen, and they have generally also been benefited, and have also been of advantage to their respective houses, by having interesting conferences with the house force, and now they have gone to their work with renewed zeal.

The business of 1899 has closed very satisfactorily. It is very rare, indeed, that the Hardwareman finds a year when things generally "have come his way," as they have done in 1899.

Prices have advanced, trade has increased, and, in the general prosperity, credits have been much improved, and losses are very small.

It is a great change from the steady and rapid depreciation of prices on goods and also of credits that prevailed from 1893 to 1898. The new year begins with excellent prospects. The feeling that existed on the part of some during the last half of 1899, that when the open season had closed, and the actual consumption of goods had fallen off, stocks of goods might increase on the hands of manufacturers to such extent as to weaken prices, has passed away. Instead of prices weakening they have grown firmer, some goods have advanced, and it is a strong market throughout.

It is now evident that both wholesale and retail dealers can enter upon the spring business with the well grounded expectation that prices will not be lower at an early day. No wideawake, down to date merchant will feel disposed now to reduce his stock below the full requirements of his trade. On the contrary, he will have no empty shelves. Consumers are buying goods more readily than usual, and these are the times for the merchant to have what his customers want. There may be a few articles—such as Barbed Wire—on which the price may reduce the demand to a moderate extent, but even in these cases the decrease will probably not be large, and in general Hardware the probabilities are that the trade in 1900 will exceed considerably that of 1899.

Referring further to prices, the facts are that the prices of Hardware generally are but little higher than they were in 1892, and they had then been passing

through years of depreciation reaching back into the early eighties. Careful examination proves that Hardware prices are now not excessively high, and while these prices may not be expected to hold permanently, there is no reasonable ground for expecting or fearing either an early or a rapid depreciation. Taking into account the greatly improved quality of many lines of goods—as, for instance, in Builders' Hardware—the price is lower than it was in 1892.

To sum up we see no reason why we should not now expect 1900 to prove a good year for the Hardware trade.

Louisville.

W. B. BELKNAP & Co.—The business for the new year shows a handsome steady volume day by day. Wars and rumors of wars in other countries, lofty bank discounts, and that sort of disturbances apparently do not reach the solid substratum on which our prosperity is built.

Advances in the wages of workmen at the mines and mills seem to be the order of the day, and with these advances comes increased purchasing power to great numbers.

Some of last year's contracts for supplies are not yet completed, so that a fair test of the permanence of the market has hardly been made. It is not that the goods are not wanted, but that the large advances which have been made on many of them persuade people that an average may be struck later in the year.

Any other year business would have been considered to be in good active shape, but we, during 1899, became so accustomed to the great rush for supplies that we can hardly accustom ourselves to anything less urgent.

Portland, Oregon.

CORBETT, FALLING & ROBERTSON.—The new year opens up very auspiciously both as regards weather and trade. So far we have had no winter. Grass is growing, rose bushes putting out new leaves and cherry trees show blossoms. The very forwardness of things may be our undoing later, as we prefer our winter in January rather than April.

Trade so far in January is running far ahead of 1899. This, of course, is largely due to the weather, and we may fall off later. Our great staple, wheat, shows no improvement in price, and a very large proportion of the 1899 crop will be carried over into the 1900 cereal year.

Prices show no marked change from those prevailing in October or November, except in the Nail and Wire products of the American Steel & Wire Company. The trade generally expect the present high level of prices to hold well into the first half of this year.

Cleveland.

THE W. BINGHAM COMPANY.—It is too early in the year for things to have gotten a fairly good start. We, as many others, are busy with inventory, and are not to be approached upon any other subject. Quite a few advances have been announced since the first of the year, and are being generally taken advantage of. The results of last year's business being, as a rule, so entirely satisfactory, the advanced wages, the general prosperity, all point to an excellent and remunerative business for some time to come.

Nashville.

THE GRAY & DUDLEY HARDWARE COMPANY.—The new year's business has started out in a most satisfactory manner. All the salesmen are on the road, and orders are coming in at a lively rate. The packing rooms are crowded, and the stock men are working at night to keep up.

All spring and summer goods are moving freely, especially Chains, Hames, Steel Goods, Poultry Netting, Freezers, Wire Cloth, &c.

Prices are being well maintained, and we hear of very little cutting. Collections are reported as being fairly good, although they are not so satisfactory as the sales.

Wire Cloth.—The market for Wire Cloth is in a peculiar and not altogether satisfactory condition. While

most of the jobbers have covered their requirements for the coming season there are a good many jobbing houses and large retailers who have not yet made contracts. The manufacturers, however, are not in a position to accept further orders, owing principally to the difficulty they experience in obtaining Wire. As a consequence, while a few weeks ago the manufacturers' price was \$1.40 this price and practically all others have been withdrawn, and manufacturers are refusing to make contracts. The present condition of the Wire Cloth and Netting industries, so far as the manufacturers are concerned, is one of entire dependence on the ability of the Wire drawers to furnish Wire. The unprecedented demand for Iron and Steel outside of the Wire industries has affected both the supply and the price of Wire. There is so large an amount of Billets being diverted from the Rod and Wire mills into Rails, Architectural and Bridge Construction and Merchant Iron that the scarcity of Wire is being felt to-day more than at any other time during the past 12 months. This feature is the cause of the difficulty the manufacturers experience in making deliveries at all promptly, and there does not seem to be any avenue of relief opening by which the manufacturers of Wire Cloth and Netting may receive an ample supply of Wire, except that of the increased products from the mills now under construction. The advances recently made in Wire directly affect Wire products and the shortage of Wire gives additional tone to the market. It is well known that manufacturers have been forced to pass desirable orders, being unable to obtain Wire to make the goods, so that there is every indication of the constantly increasing firmness of the market until the close of the present season.

Tackle Blocks.—Some of the manufacturers of Tackle Blocks have been withdrawing outstanding quotations and announcing somewhat higher prices. The market is therefore firmer, with an excellent outlook for business.

Horse Nails.—There continues to be a steady market in Horse Nails, with no important changes in price. This line is notable as characterized by substantially the same prices as were current a year ago.

Utica Drop Forge & Tool Company.—Smith & Hemenway Company, 206 Broadway, New York, advise us that the Utica Drop Forge & Tool Company have recently changed their terms to meet with the ideas expressed at the recent National Hardware Association Convention relative to cash discounts. They not only believe in giving a little cash discount, but to the man who pays promptly they are naming from this date on better discounts than given heretofore. Their terms in the future will be as follows:

3 per cent. off for cash in 5 days from date of invoice.
 2 " " " " " 10 " " " " "
 1 " " " " " 20 " " " " "

These terms will be strictly adhered to and parties taking 6, 11 or 21 days will not be allowed these terms, those discounting in six days being given 2 per cent., in 11 days 1 per cent. and after 20 days net.

Oils.—*Linseed Oil.*—Under date of January 10 manufacturers of Linseed Oil advanced prices of City Raw 3 cents per gallon. A fair amount of Oil is being distributed, mostly in small lots. Quotations are as follows: In lots of less than five barrels, 54 cents; in lots of five barrels or more, 53 cents per gallon. Boiled Oil, 2 cents per gallon advance. State and Western Oils rule at 51 to 53 cents for Raw according to quantity. Calcutta Raw Oil continues at 65 cents per gallon.

THE trade will observe the advertisement on another page in which the Merchants' Wire & Nail Company, St. Louis, Mo., announce their desire to purchase wire drawing benches with 20 blocks and wire nail machines cutting Nos. 15 to 23 wire. These are desired for the equipment of their plant.

ALDEN RUBBER COMPANY, Barberton, Ohio, have appointed John H. Graham & Co., 118 Chambers street, New York, general sales agents for the distribution of their Bicycle and Vehicle Tires and Molded and Mechanical Rubber Goods.

Iowa Retail Hardware Dealers' Association.

The following stirring appeal to the members of the Iowa Retail Hardware Dealers' Association has been issued by Mrs. Henrietta E. Kupper of Burlington, the indefatigable and enterprising secretary. The circular refers, it will be observed, to the annual meeting in February, and the importance of having as many merchants of the State as possible at the gathering in order to adopt measures for the protection of the retail trade:

The importance of our organization was never so manifest as now. We face the demand of our customers for old prices and at the same time face a National Jobbers' Association that puts on every advance the minute it is made, and have an iron clad understanding that permits excessive advances. We also face market conditions, where advances are in many cases out of proportion to what they should be. Our only hope to influence the situation for the better is in thorough and systematic organization.

If we can count on your individual help for the next 60 days, in securing the membership of your neighboring Hardware merchants, we can go into our second annual meeting the second Wednesday in February with over 500 members. We must have this number to give our demands proper weight with the jobber or manufacturer.

We are threatened with the return of box and cartage charges, stiff advances on freight and large differentials between car lot and local shipments. We need new legislation on collection laws.

We feel that we can, by a thorough organization, influence the Jobbers' Association very largely against unreasonable demands and unreasonable profits; also, that we can secure action by the National Jobbers' Association that will take many of our household specialties out of the hands of the grocery trade.

Kansas will organize in January, and it is but a question of a short time until every State is in line. Will you help us to make Iowa lead the van in numbers and enthusiastic work for our profession?

Inclosed find five applications for membership. See that every one gets into the hand of a dealer in your county not now a member, and that they are with us for the coming year, and see them personally, if possible. Begin with the other dealers in your own town.

The programme for the annual meeting which will be held at the New Auditorium in Des Moines, and cover three days, is as follows:

The convention will open on Wednesday morning, February 14, at 10.30, with a meeting of the Executive Committee. The afternoon session will begin at 2 o'clock with the enrollment of new members. The president's address will follow, after which there will be reports from the secretary, treasurer and committees. A paper will then be presented by Senator E. G. Penrose of Tama on the subject of "Benefits to be Derived from Membership in this Association." At the evening session a number of ten-minute papers on topics of special interest will be read by E. H. Morris, Cedar Rapids; C. W. Breesford, Villisca; Frank L. Anderson, Webster City, and G. W. Huber, Olin. Discussion of the papers will follow.

Thursday morning, February 15, the session will begin at 9 o'clock, with several ten-minute papers. S. R. Miles, Mason City, will present one on "Co-operative Buying." Mr. Miles will be followed by E. A. Rea of Corydon on "My Methods of Advertising;" Jos. Mattes, Odebolt, on "Co-operative Insurance," and C. M. Doxsee, Algona, on "Window Advertising." Following discussion of these matters the Question Box will be opened and its contents disposed of. Election of officers for the ensuing year will close this session. The afternoon session will be devoted to a consideration of questions of mutual interest to the retailer, jobber and manufacturer. A number of jobbers and manufacturers have signified their intention of being present to participate in the discussion.

Friday morning, 16th, the delegates will again assemble at 9 a.m., when the regular association committees will be announced. The work of the association during 1900 will be the principal business of this the closing session, and definite plans will be decided upon to carry out the objects of the organization and promote the welfare of the retail merchant. In the afternoon the delegates will attend one of the sessions of the Legislature.

Kansas Retail Hardware Dealers' Association.

THE annual meeting of the Kansas Retail Hardware Dealers' Association was held in Topeka on January 9 and 10 at the Hotel Throop. The different parts of the State were well represented and the meeting was an enthusiastic and profitable one.

The convention was called to order by the president, Frank Rudy of Paola, who made the following address:

President's Address.

A little more than a year ago the Kansas Retail Hardware Dealers' Association was organized by a few dealers assembled in this city. How much has been accomplished during the year I will leave for our secretary to report. Possibly there has not been the interest taken or the increase in membership has not been as large as some of us would like to have seen, but I think that is the history of almost all associations during the first year and I feel very well satisfied with the work so far accomplished, and with the beginning of another year, I predict that we shall increase in numbers to such an extent that we will be well up with some of the older organizations in other States. You know Kansas never does anything by halves when she gets started. There is not any dealer in the State that can afford to remain out of this association if there was no other object in view except to meet together as a body of business men to exchange methods of doing business and become better acquainted with each other.

But there are many things which can be accomplished within this association if we work together for that purpose and eventually become one of the links in the chain of State associations which will form a national association that will be of such power in trade circles that those who now trespass upon the rights of the retail dealer will cease their methods of doing business or lose the better part of their trade.

There are jobbers, I am informed on good authority, that send salesmen into this State. One will visit the regular Hardware trade, the other calls upon other firms. Such jobbers are not worthy of the patronage of any Hardware merchant. And again there are jobbers whose salesmen do not visit that class of trade, but the house sends out trade circulars and fills mail orders. This practice should also be denounced by every dealer.

I could enumerate many objects that these State associations are organized for, but you are as familiar with these as I am. I would like to see every travelling Hardware salesman in this State a member of our association, working for its interest, and by so doing increase the ties of friendship that exist between merchant and salesman.

Before I close I wish to bring before you for your consideration a few matters pertaining to our constitution and by-laws. I think our Legislative Committee should consist of one member from each Congressional district. I would also favor having a Grievance Committee to whom all matters in that line could be referred for adjustment by the secretary.

In conclusion, I wish to thank all for the co-operation you have given me during the past year and hope my successor will have the same hearty support during the coming year and that we may all labor in harmony, and when we meet next year we will see many faces that are not here to-day, that are brought into the fold by seeing the good work our association throughout this country is accomplishing.

The report of the secretary-treasurer, J. A. Cole of Topeka, was next presented, as follows:

Secretary's Report.

This, the first report of the Secretary of the Kansas Retail Hardware Dealers' Association, will be very brief, as our members have given me very little work to do up to date. There have been some complaints made by some of the members that certain wholesale houses

were selling goods to their customers or were sending goods into their territory to consumers, and in each case I have corresponded with the wholesale house and they have in every instance treated my letters with the greatest consideration and disclaimed any intention of interfering with the business of the retail Hardware merchant and would thereafter be more careful in sending out goods. I have had but one case where a member definitely claimed damage from the jobber, and in this instance, after a full examination, the jobber allowed the amount of damage asked.

Now it may seem to some of our members that there has been but very little done, this, the first year of our existence, but if they will stop to consider they will see where it leads. "A word to the wise is sufficient," and if a wholesale dealer gets caught sending goods to those who are not legitimate Hardware dealers once he is more careful the next time, thereby helping all of us.

Soon after our organization on February 13 of last year, and acting upon instructions from the president, I sent out nearly 1000 circulars to dealers through the State, in response to which we obtained our membership of 36 members. I also had letters from quite a number of dealers who stated that they were heartily in accord with this movement, but as they handled Implements with their Hardware and were members of the Implement Dealers' Association, having some 1000 members in this State, they did not think they were justified in joining this one; but I do not think they quite understand our position, for although we are not many as yet in numbers, we can depend upon the assistance of every Retail Hardware Dealers' Association in the United States, if we should need it and ask for it.

I have answered a good many inquiries in the past year from dealers who wished to know about our association, but they would invariably decide to wait until this year before joining. I hope they have not changed their minds.

I notice that the Missouri Association is offering an inducement to the traveling men to get their customers to join their association and I think the idea is a good one and worthy of our consideration. We have about 1000 retail Hardware dealers in this State and we ought to have a majority of them on our membership list. At the third meeting of the North Dakota Association the secretary reported nearly 60 per cent. of the dealers in that State as members and that they were right after the other 40 per cent.; but it takes more than the secretary to do this, we want every member to feel that it is his duty to get other members and to send to the secretary any such matters that occur to them that would be of interest to our association.

There are at present 16 organized retail Hardware dealers' associations in the United States and a movement is being made to form a national association. Our president has received an invitation to a meeting in Chicago on February 12 to perfect the organization.

Committees Appointed.

An Auditing Committee was appointed by the chair, consisting of J. H. Foucht, North Topeka; Oscar Rohr and W. E. Culver, Topeka, and E. I. King of Logan.

The Committee on Resolutions consisted of J. H. Hamilton, Arkansas City; R. F. Kelterman, Velits, and D. H. Forbes and W. S. Chaney of Topeka.

A paper was then read by J. F. Berger of Anthony on

Credits in the Retail Business, How to Control Them.

Credit is a term in political economy of which we possess no scientific definition. The practical meaning, however, is well known. The proper conception of credit is that which serves the purpose of capital. It can only do so while there is capital ready to come and take its place when necessary. Credits which are not in this position do not accomplish the purpose of capital.

The practical position of credit in the retail business is exemplified by a sponge saturated with water:

"Squeeze it and you can 'throw up the sponge.'" Credit is imposed upon a community for two very good reasons: Lack of money and greed of gain. The larger part of credit granted in the retail business is given to those anticipating the future—till they raise a crop—and is unsafe, while the part given to those of known responsibility is practical and usually safe.

The retailer who runs his business like a pawnshop, taking in everything, and charging more profit for the larger risk, must come to grief. I venture the assertion that in every town of 2000 population in the United States there is continually an outstanding credit of \$50,000 which no single creditor desires.

Why is this true? Because very few dare to declare for cash only, single handed, and concerted action is practically impossible.

Many retailers, before they have been in business six months, have their

ENTIRE INVESTMENT CREDITED OUT,
doing business on jobbers' goods entirely. When, for any reason, they are forced to meet their obligations, they learn for the first time the real meaning of credit. Under existing circumstances credits have been shortened and discounts cut down to the retailer. If he is wise he will follow the good example set him by those closer in touch with the needs of the hour than he. Each successive season credits are more closely investigated by the credit men and it is to be hoped they will succeed in weeding out the old fogies, who, following antiquated methods, finally go to the wall, beat the jobber and leave a stock of goods to be disposed of to the ruination of legitimate trade at that place for some time.

HOW TO CONTROL CREDITS.
The control of credit in retail business is of much greater importance than the signification of the term. It depends so largely upon the personality of the merchant that anything but the most arbitrary rule strictly adhered to must fail of usefulness to many. Standing behind the counter and coming in personal contact with each customer, who in many instances is friend or neighbor, makes a correct business attitude more difficult than that of the credit man at his desk. Certain it is that you possess a more accurate knowledge of your customers, but more certainly it is a fact that a proper consideration of all the conditions, which must be considered and acted upon instantly, is more difficult, *except it be an absolute refusal of credit.* I am speaking now of customers known to you not to be prompt and legally responsible. Properly controlling credits is

THE MERCHANT'S NIGHTMARE.
Whether he be careful, conservative and painstaking, or careless and slothful, the credit portion of his business brings him more sleepless nights and gray hairs than all other business cares.

RULES IN GRANTING CREDIT.
If I were obliged to leave my store in charge of clerks for a considerable length of time, I would lay down the following rules for them to observe in granting credit:

1. Open accounts only with persons of known responsibility.
2. Take title notes for one-half bill, demanding half in cash. Always have note recorded.
3. Trust no strangers unless account is guaranteed by some responsible person known to you.
4. Avoid opening accounts for less than one dollar.
5. Always set a day for payment.
6. Collect promptly as agreed.
7. Avoid long time sales.

These rules strictly followed would undoubtedly lose you about one-fifth of your trade, principally the undesirable fifth. If business men would follow such rules, it would tone up trade, make their daily life pleasanter, stop aggravating losses and be better for customers as well.

Finally: Controlling credit is a matter for individual

action, and no information will benefit the merchant who cannot say No, or who insists on making such unsafe sales for the chances of making a profit, which is as often as bad speculation as bucket shop deals.

SELL FOR CASH.

The real and only safe way to control credit is to sell for cash. Hasten the arrival of that day.

The following paper, prepared by S. J. Gilbert of Arkansas City, was then read:

Advertising.

It affords me great pleasure to thus communicate with you at this our anniversary. We are one year old now. I can truthfully say that our meeting one year ago has been of great profit to me. I wish to express my sincere regrets that I am unable to be with you in person, but I assure you that my heart is in the work.

Our worthy president has requested me to make a short talk on the subject how to advertise our business. This to me is a very important factor of our work as retailers. First, let me say that I believe in Barnum's motto—viz.: Advertise and get rich. I have not succeeded in getting rich yet, but I have made some good money for the store which I have the honor to represent. You notice that I consider it an honor to be in the hardware business, and I think there is no more worthy trade than it.

NEWSPAPER ADVERTISING.

Judicious advertising in the newspapers is, I think, the best method of reaching the people, for they will read the papers, and the editors are striving hard to make the paper interesting to read. I think that all good men are not Hardware dealers, but all Hardware men are or should be good men, and they will do just as they advertise to do. I feel gratified with the result that I have obtained by newspaper ads. I change my ads. often, and then I read *The Iron Age* and keep track of prices, or rather keep track of the "trusts," and then I go and change my ads. again. I try to make my ads. so that they will be interesting, and ask the printer to keep

CHANGING THE APPEARANCE

of my ad., and I must say that I think this is the best way. In the first place, we must have our store nicely arranged and have everything neat, and then we must have a good, hearty handshake for all our customers. I am a Methodist, and I believe in the old fashioned Methodist handshake.

COOKING EXHIBITION.

We spent \$75 this summer advertising in the papers for a cooking exhibition, and put a large range in our wagon and drove all over town, and had a large cow bell, and would pull the string to make it ring. I also had some circulars and some posters put on the bridges, but I cannot help but think the newspaper ads. were the most useful by long odds. We made it a point to see that every man, woman and child got a hot biscuit and a cup of hot coffee. It paid us.

We must ask our customer

HOW IS MARY JANE

and Peggy Ann, and how is the crop, &c. We must be interested in their welfare. One of the best things that I know of is to keep up a hot fire in winter and a good tank of ice in summer.

I think that it pays to get a special line of good goods and talk them and speak of them in the paper. Then get another special line and keep up the

EVERLASTING PERSISTENT ADVERTISING

that will keep the people coming, and keep up that good old handshake and keep up the hot fire in the winter and the good ice water in the summer. Do what you say you will do in your ads. Be sure that you say something that will cause them to think of your store all the time. Buy goods only from houses that will protect you, and take a short trip to Kansas City or St. Louis, and you

will find new ideas. Well, let me say in conclusion that I think the following ideas are the best methods of advertising our business.

1. Good fresh ads. every few days in the paper.
2. Keep a neat, clean, up-to-date stock well bought.
3. Remember that old fashioned handshake.
4. Keep up the fire and don't forget the ice water.
5. Have your whole life (except your soul) in your store.
6. Go to church every Sabbath, and take the family.
7. Keep plenty of money on hand to cash checks and make change.
8. Be sure and keep money on hand to pay your bills promptly.
9. Keep up your dues in the Kansas Retail Hardware Dealers' Association. (I inclose my draft for \$3 for dues for 1900.)

A general discussion of letters read followed. The question of engaging traveling salesmen to secure members of the association was brought before the meeting and acted upon favorably.

National Association.

Letters were read from the Iowa and Illinois Association upon the subject of forming a national association, and after due deliberation a committee was appointed to select a delegate to attend a meeting to be held in Chicago to consider the feasibility of a national organization.

A general discussion of various grievances of the retail Hardware dealer closed this session.

Second Session.

The second session was opened by reading a letter of greeting from H. A. Cole, president of the Iowa Hardware Dealers' Association, regretting his inability to fill his place on the programme. Mr. Cole congratulated the organization, and urged that some action be taken in regard to the National Association.

Resolutions.

The following resolutions were adopted:

Resolved, That the Kansas Retail Hardware Dealers' Association request our Senators and Congressmen to use their influence and votes against all trusts and combinations.

Resolved, That we are opposed to the trusts and combinations of the present day, and will, as far as possible, deal in goods manufactured outside of them.

Mutual Insurance.

The matter of mutual insurance was brought up and very favorably discussed, and referred to a committee for further consideration.

It was recommended to the Executive Committee that they call the next annual meeting at Kansas City, Kan., two days previous to the convention of the Implement Dealers' Association.

Officers Elected.

The election of officers for the ensuing year resulted as follows:

Frank Rudy, Paola, president.
George F. Anderson, St. Marys, vice-president.
J. A. Cole, Topeka, secretary-treasurer.

EXECUTIVE COMMITTEE.

James H. Hamilton, Arkansas City.
W. S. Chaney, Topeka.
E. I. King, Logan.
J. F. Berger, Anthony.
Miles Boyle, Garnett.

S. L. Fenner Hardware Company, Terre Haute, Ind., have been incorporated with a capital of \$10,000. The company refer to prospects for business during 1900 as very bright. They will remodel their store and equip it with fixtures and conveniences which will bring it up to date. They are also intending to build an addition in the rear, 24 x 40 feet.

Australian Letter.

MELBOURNE, December 19, 1899.

CONDITION OF TRADE—Trade all along the line during the past four weeks has been very satisfactory, although influenza has had a demoralizing effect among principals and employees alike. One firm of wholesale providers employing 1000 hands had 250 absent in one week.

Prices still continue upward especially in heavy lines Galvanized Bar and Sheet Iron and Steel. English producers still have more orders on hand than they can meet and the high prices ruling here are chiefly due to this cause.

The Agricultural Implement trade has had a very brisk time of late, especially local makers. There is ample room here for another American company to carry stocks and parts, and the trade, especially in regard to payments, is on a much better basis than a few years ago.

Shelf Goods, Plated Ware and Sporting Requisites are now selling freely. In the last two lines America has a very poor hold out here, and although competition in Plated Goods would be fiercely resented there is an open field for almost every kind of sporting requirements.

In view of the possibilities of federation it will behoove your merchants and manufacturers to keep a very watchful eye on these small States.

AXES.—The Australians in buying Axes have long been accustomed to being served with and accepting without demur as the best Tools of American make. English Axes have been too thick and heavy, but these faults are disappearing and the American fashion is being followed. The market, however, is still America's, if they like to keep it. It is merely a question of attention, not of price, nor at present of quality.

A COMBINATION OF RETAILERS, to be called the Store Keepers' Association of Victoria, is being formed. Country ironmongers and store keepers are expected to join in large numbers, and there is no doubt that once in going order the association will possess much power and influence in the way of preventing cutting of prices, exorbitant railway and freight charges, and will also be a factor in politics.

Requests for Catalogues, &c.

CHARLES A. TOBIAS, who is about to open at 1131 Ridge avenue, Philadelphia, with a full line of Hardware, House Furnishings, Tools, Cutlery, &c., requests manufacturers and jobbers to forward catalogues, price-lists, &c., covering above lines.

J. P. Futrell and R. L. Hardy, under the style of Futrell-Hardy Hardware Company, embarked in business January 1, at Scotland Neck, N. C. Besides a general line of Hardware they are handling Stoves, Mill Supplies, Lime, &c. They will appreciate copies of catalogues, price-lists, &c., from the trade.

Lincoln Hardware Company have succeeded Baldwin Bros. Hardware Company, Lincoln, Neb. They are retailers of Shelf Hardware and Sporting Goods, and wholesale Heavy Hardware. The company will be pleased to receive catalogues and quotations from manufacturers and jobbers.

J. H. Nieman has opened a general Hardware, Stove and Tinware store at Sunman, Ind., and would be pleased to receive catalogues, price-lists, &c., from manufacturers and jobbers.

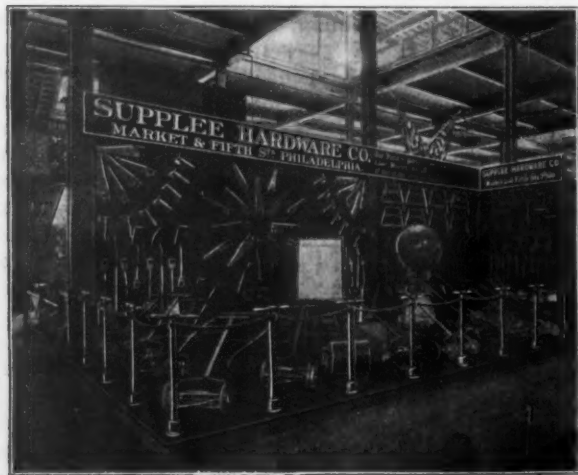
M. F. Allen Hardware Company, Paris, Texas, have sold their business to Allen-Willis Hardware Company, who have incorporated under the laws of Texas with a capital of \$20,000. The new concern will job Hardware in Northern and Eastern Texas. Mr. Willis was formerly a member of the firm of Roberts, Willis & Taylor Company of Sherman, the interest in which business he disposed of to Mr. Sanford in 1894 on account of failing health.

Hardware Exhibits at the National Export Exposition.

Second Article.

The Supplee Hardware Company,

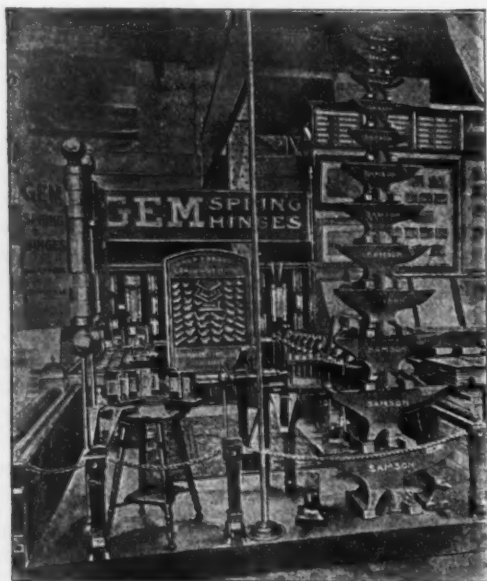
Philadelphia, had a very large exhibit covering their well-known line of Pennsylvania Lawn Mowers. Fronting on two aisles and inclosed within a unique railing it at-



tracted a good share of attention. The railing posts were Lawn Mower Handles, and each post bore the name of a Mower. The top rail was a heavy green cord. On an easel facing the corner of the exhibit was a framed list of the medals and awards won by the company in different parts of the world. In the center of the space was a pedestal carrying a large painted globe, signifying that the reputation of the Mowers was world wide. The company's line of Continental Mowers was also prominent in the exhibit. A late addition to the general line, the Pennsylvania Golf Lawn Mower, attracted the attention of visitors interested in field sports. This Mower cuts close to the ground, and cuts smoothly on both even and uneven surfaces. It has six knives, and is made in six sizes. Another novelty was their Great American Ball Bearing Lawn Mower, which is claimed to be as perfect in its construction as any bicycle. It is made in four sizes.

The Van Wagoner & Williams Hardware Company,

Cleveland, Ohio, had a very interesting exhibit. The front was ornamented by a chain rail hung from ornamental oak pedestals. To the right of the entrance

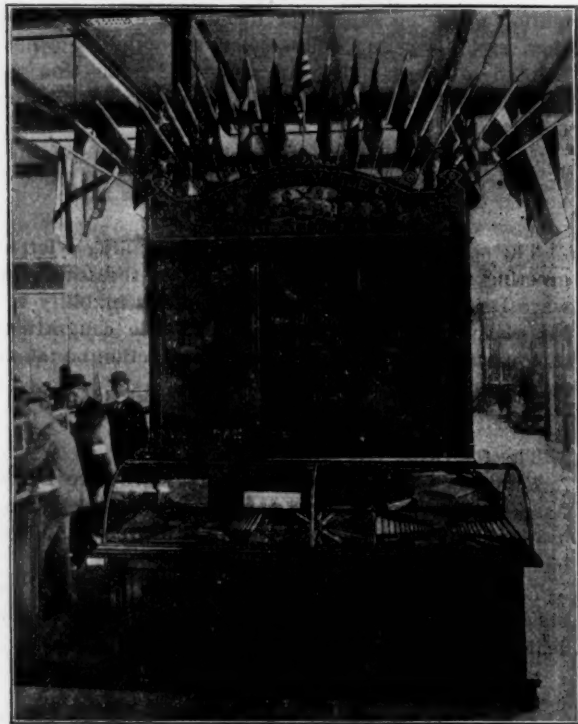


was a line of Blacksmiths' Vises, while at the entrance was a large column of Anvils. A 20-pound Vise, bolted to a pedestal, located near the entrance, was an object of

much interest. At the left was an immense Spring Hinge, made of wood and gilded. This Hinge bore the sign, "Gem Spring Hinges—20 years of success." Inside the exhibit was shown a model building section carrying a line of Joist and Wall Hangers. The Oxford Hinges, for water closet doors, fitted with special cushions to hold the doors open at any angle, were prominent among the goods shown. The Hinges were also shown in a style arranged to swing two doors from one marble partition. Other goods shown included adjustable Columbia Screen Door Hinges made in single and double action styles in all finishes; and the Columbia Hinges, for water closet doors, with and without boxed flanges. A paneled screen at the rear of the exhibit showed a line of Commutator Segments for electrical purposes. A large line of Drop Forgings, covering Bicycle and other parts, was also shown. The exhibit was awarded a silver medal and diploma.

The McCaffrey File Company,

Philadelphia, had one of the handsomest exhibits in the Hardware section of the exposition. The exhibit occupied a space 15 x 10 feet, fronting on three aisles. The



rear of the space was taken up with a large oak show-case, 11 x 10 feet in size. The lower portion of the case consisted of cupboards used for storage purposes. The upper portion was used to display an assortment of the company's well-known Files and Rasps, and was divided into three parts or panels, each lined with black cloth. These panels carried designs worked out entirely in Files. The center panel was used for a representation of the Liberty bell, surmounted by an eagle. On the side panels were some pretty designs, including stars, crosses and national flags. The stripes and ground in the latter were formed of Files and Rasps alternately placed, and the stars were formed from punched plates. The Files used in the designs were all ordinary Files taken from stock. Running the length of the case was an inscription, "Established 1863. American Standard Files and Rasps." The top of the case carried an ornamental sign topped with the flags of all nations. Beside the company's name the sign had a well executed painting of the Pennsylvania arms, and relief *fac-similes* of the medals won by the company. A large counter case, containing a sample of nearly every kind of File made in the company's works, was a part of the front of the exhibit. At the left front was a bench fitted with Vises holding circular and hand Saws, and pieces of metal, in order that any one wishing to do so might test the qualities of the Files.

The Harrington & Richardson Arms Company,

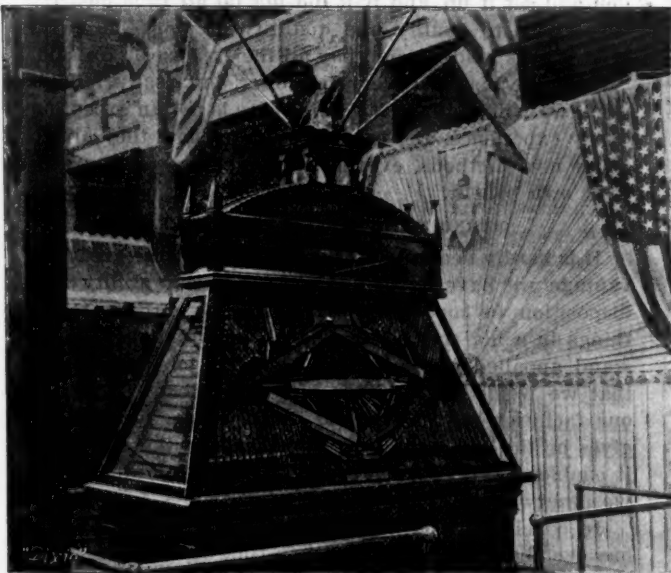
Worcester, Mass., had spacious quarters, used mostly for office purposes. At the front of the space was a handsome oak showcase, in which was displayed a line of the



Revolvers made by them and so well known to the trade. Among the articles forming the furnishings of the exhibit was an easel on which was a handsomely framed picture of the company's works.

The G. & H. Barnett Company,

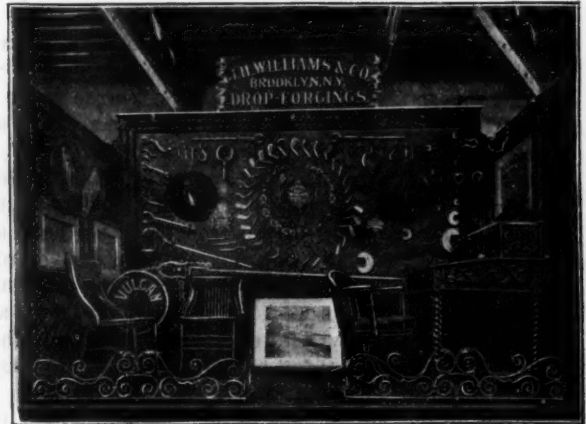
Philadelphia, manufacturers of the well-known Black Diamond Files and Rasps, had a fine display of their productions. The exhibit was contained within a handsome



cabinet, open on all four sides. The Files and Rasps were arranged to form pleasing designs, and all the different styles made by the company were included in the exhibit. The ornamental top of the cabinet carried a large black diamond, in the center of which was a large silver plated File, the whole being a representation of the company's trade mark. The cabinet was surmounted by a gilded eagle, with silk flags of Pennsylvania and Philadelphia side by side with national flags, also of silk. In front of the cabinet and on a plush pedestal was displayed a monster File, weighing 210 pounds and exhibited as the largest File in the world. A substantial brass railing inclosed the exhibit.

J. H. Williams & Co.,

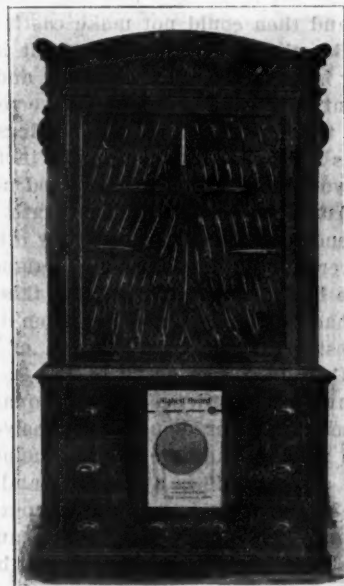
Brooklyn, N. Y., had a well arranged exhibit of Drop Forgings. An oak screen bounded their space on three sides and an ornamental wrought iron railing completed the inclosure. The central figures on the board were two Vulcan Chain Pipe Wrenches, one each with cable and flat link chain, surrounded by a circle of Vulcan Wrench Jaws. Another circle surrounding the Vulcan Wrench was composed of drop forged Golf Club Heads of various designs. On either side of the central circle were two smaller circular bunches of special Drop Forgings. At the right hand side of the board were shown a line of handsomely finished Engineers' Set Screw and S Wrenches,



while at the opposite side were shown the same Wrenches in the unfinished condition. A large Eye Bolt was shown on the left hand upper side, while directly opposite it on the other side was a big drop forged bent tail Lathe Dog. The board also showed specimens of Track Wrenches, Construction Wrenches, Spanner Wrenches, Tool Post Wrenches, Machine Handles, Crank Handles and other standard drop forged specialties. An interesting feature of the exhibit was the monster No. 16 Vulcan Chain Pipe Wrench, shown at the base of the board with the chain encircling an 18-inch pipe. This is said to be the largest Chain Pipe Wrench ever made, measuring 87 inches in length, weighing 137 pounds, with chains taking fittings on pipe as large as 18 inches, while each chain tests to a strain of 40,000 pounds.

The National Cutlery Company,

Philadelphia, had a complete exhibit of their line of Shears, displayed in a handsome oak case. The line com-



prised straight and bent Trimmers in different styles, Barbers' Shears, Bankers' Shears and Forged Tinnerns' Snips. One style of Shear was shown having a lock nut

and bolt to secure the blades, preventing the sections from working loose in use. The exhibit gained a silver medal and diploma.

Correspondence.

American Manufacturers and Foreign Trade.

To the Editor: I have read with interest the numerous articles and letters that have been published from time to time—both in *The Iron Age* and other trade papers—concerning the advantages the United States has over other countries in the Iron trade. I notice, also, that many of the writers leave out many important advantages we have over other countries, and nearly all of them leave out one of the most important items in this connection. It is generally understood that Great Britain is our most formidable competitor, or, rather, we are their most formidable competitors for the trade of the world, and many people think that our greatest advantage over Great Britain is our protective tariff. I do not underestimate the full value of our excellent tariff laws in some branches of manufacturing, but I think in other branches of the Iron trade we have advantages which far outweigh any that we derive from our tariff, and these are advantages which the great majority of our manufacturers are ignorant of and are rarely mentioned by writers on this subject, and when they are mentioned they fail to give them that important weight and consideration which they should have in weighing up our advantages in our competition for the trade of the world.

OUR SUPERIOR CAST IRON.

One of the most important—and yet the least understood—advantages is the superiority of our Cast Iron, especially in the manufacture of light machinery. As far as my experience goes—and it has been quite extensive—I know of no other nation that produces castings that can compare with ours for lightness, smoothness and strength. Especially is this true of English castings. A London merchant once took me through his large sample room, in which he had a great variety of articles made of light castings of both English and American manufacture, and he said he could pick out the American goods by the quality and smoothness of the castings.

OUR FINE CASTINGS.

Another manufacturer in Liverpool asked me (referring to our own goods) how we made such smooth castings. I told him we had finer sand. Ah, no; he said that was not it, as they had imported some of our best sand and then could not make castings as smooth as ours! But the most important merit in the American casting is the strength of our Iron, and I can speak on this point with confidence, as I have repeatedly and practically tested it. I have had castings made from our patterns in English foundries and I invariably found that they would easily break, and stood no comparison with our American castings for strength. I have had this experience confirmed repeatedly by other American manufacturers doing business in England. One gentleman who had a large experience in this line told me that they had satisfied themselves from thorough and scientific tests that the tensile strain of English and American Cast Iron was as 70 to 100 in favor of the American, and my experience of over a quarter of a century as a manufacturer doing an extensive business in the English market leads me to the conclusion that the comparison above made is a fair one, and conforms to the facts. Of course this superior strength enables us to build a machine 30 per cent. lighter than our English cousins, and yet have it of equal strength.

SUPERIORITY OF AMERICAN MECHANICS.

Another advantage I have discovered is in the superiority of our American mechanics. Now, this needs an explanation. I do not believe in the broad assertion

that some writers make that all British workmen are an inferior class of beings. I have met with English mechanics just as intelligent as any I have met with in this country; but there is not so large a percentage of them. Our men are generally intelligent; the really intelligent English mechanic is the exception and not the rule, and this is the fault of their system rather than the fault of the man. The English mechanic has not the same incentive to inform himself as the American has. He might have the wisdom of Solomon, and it would not raise his pay or better his position. As a rule there is no premium on brains for the English mechanic; he is paid for muscle—not for brains. On the other hand, we pay a man for both, and get the advantage of both. We reward intelligence and genius above any other country on the face of the earth, and hence we are developing a more intelligent class of mechanics, and, as a consequence, are able to make better Tools and machinery, and have these Tools and machinery worked to better advantage than our competitors, and as a final result we can turn out better work and more of it than any other nation.

IMPROVED TOOLS AND MACHINERY.

I find another important difference in our respective systems of manufacturing; we spend more money for improved Tools and machinery than the English manufacturer; we are constantly on the alert for Tools that will turn out work faster and better, while the general rule in England is that the old way is good enough. I had a very amusing experience illustrating this very point. I called on a manufacturer in a certain town in England for the purpose of selling him a machine to be used in their line of manufacturing. After explaining my purpose he said they did not believe much in new machinery. I told him it would save 15 per cent. in manufacturing and make a much better article than by the old method. But this had no apparent effect on him. I then told him as a last resort that these machines were used by all the leading factories in their line in the United States; would bring a machine from London and set it up, and if it did not do all I claimed for it—both as to quality and quantity of work—he could send it back, and I would pay all the expenses. He said, "Well, sir, that is a very fair offer, but really I don't think we will go in for it." This case is not an exception in my experience, and only shows how slow they are to adopt new methods, even in those things which are to their own benefit.

COPING WITH LARGE ENTERPRISES.

It is hardly necessary for me to speak of the great advantage we have as manufacturers in our ability and disposition to cope with big things, or, rather, to do things in a big way. The English manufacturer would stand appalled at the magnitude of a job or contract that we would not hesitate a moment about. And yet our facilities for turning out work in large quantities gives us the advantage in the markets of the world, as it enables us to turn out work better and cheaper than we otherwise could.

In conclusion I would say that I do not think there has ever been such an opportune time in the history of our country for us to step in and monopolize the trade of the globe as the present. The whole world seems to be waking up to the fact that we are a great manufacturing nation; that our material is exhaustless; our facilities unsurpassed, and that we have an enterprise and ability that must make us a nation of manufacturers second to no other.

T. COLDWELL, Newburgh, N. Y.

The firm of Ed. Oldham & Son, Waxahachie, Texas, have been succeeded by the Oldham Hardware Company, incorporated with a capital stock of \$12,000, fully paid. Ed. Oldham is president of the company; Cary Oldham, secretary and treasurer, and William Moore, general manager. They will continue to carry a full line of Builders' Hardware, Stoves, Plumbing Supplies, Mantels, Tiling, General House Furnishings, &c.

British Letter from Our Special Correspondent.

I HAVE recently had some conversation with a well-known American manufacturer, who came over here last year to push a Hardware specialty. He traveled all over the British Isles, then took a trip through Europe, and was favorably impressed with the possibility of working an agency in this country for American Hardware, more particularly small domestic ware. A well-known English agent getting into touch with this gentleman, they determined to open up a department under the style of Blank & Blank, American Exporters and Importers, London, E. C. I asked the American partner what were his impressions of the British trade, so far as American goods were concerned.

"I am convinced," said he, "that the importation of American Hardware into England has only just begun, with no limit to our possibilities. Up to the present, I have entirely confined my attention to merchants and agents. I have, however, met a few large retailers. It is my intention, however, to confine at present to merchants and agents, mainly because I have made many solid friendships among these two classes."

"Don't you find them very conservative?"

"When I came over here last year I was expecting to have no end of difficulty, on account of the British merchant's traditional conservatism. I found that that tradition had worn thin, and, in fact, my experience is that the British buyer, if steady, is very keen. Two points have impressed me. The first is that they will always buy goods on their merits; the second, that the representation as to the quality of goods must never go beyond the actual quality of the goods delivered. The British dealer takes you literally. He makes no allowance for the natural optimism of the seller, and if he finds that your goods are not up to your representations, it is bad for you next time you call. I found that some damage had been done to American reputation on account of young travelers who do not quite appreciate this aspect of the British buyer. I have now been round to see my customers more than once, and I am welcome wherever I go because my promises have never exceeded their fulfillment."

"What strikes your British buyer as their chief characteristic?"

"Well, I find that report this time speaks truly, for the American reputation for light and slightly goods is just what strikes the Britisher. It is possible that a good many American articles might with advantage be more substantially made; but, speaking generally, I should say that we are educating the British buyer to the patent fact that heaviness does not necessarily imply strength."

"I suppose you must stock pretty heavily in this country?"

"Yes, and what is more, you have to stock pattern lines of goods for one section of the country, and another for some different section. That is a very important point to be remembered by American exporters. What sells in the Midlands of England is probably unknown in the South, or East, or North, and the first thing an American has to do is to discover what lines he can safely offer in different districts. For example, a friend of mine came over here some time ago with a line of Rakes. He found he could make no headway at all, but he set to work and ascertained what kind of an article was required here and what kind there; then he got his firm to make to pattern, and he has eight or ten different styles of Rakes which he stocks heavily for eight or ten different sections of the country. Not only does he stock heavily, but he gets advance orders and sells large quantities direct from his works in America."

"And how would you recommend an American to sell his goods—to merchants, or factors, or direct to the retailers?"

"That is another thing you have got to find out for yourself; some lines are best sold through the mer-

chant, others through agents, and others direct. I should say broadly that the best system is through the factors or agents, but care should be taken not to tie yourself down too closely. Experience teaches that one agent is strong in one part of the country, while another agent is strong elsewhere, and it is your business to get your goods sold everywhere."

"What about your experience on the Continent?"

"Well, I am just off for another long trip, not only over my own ground—France, Germany, Austria and Italy—but I am going to tackle Russia and Scandinavia. With good American lines well introduced and well advertised, but always truthfully, the American export Hardware trade has a great chance both in great Britain and Europe."

A QUESTION OF CREDIT.

I should like to indorse the advice given as to the advisability of American exporters dealing through merchants and agents, rather than going to the retail trade direct. For this reason: The British system of credit differs widely from the American. The British Hardware dealer is one of the slowest payers in the country, and seems hurt if you ask for your money in less than six months. Even at six months he will ask for 2½ or 5 per cent. discount. This does not imply any instability on the part of the British Hardware trade. As a matter of fact, it is one of the safest trades in the Kingdom. I think the merchant is more distinctively the Hardware banker than anybody else; he advances goods instead of money, and thereby secures continuity of orders. I was amused with an American manufacturer who was over here a short time ago. He runs a branch establishment in London, and came to see me just after he had been examining the books. When he saw the length of credit extended to nearly every customer on the books he was amazed. He asked whether I thought that any large proportion of the book debts would be bad, and when I laughed at him he remarked that, having made the same observation to his manager, the manager laughed, too. There has never been any systematic attempt on the part of the merchants and manufacturers to improve terms of credit. There is no National Hardware Association, as in America, and no association of any kind among merchants and manufacturers that can speak authoritatively.

"The Man in the Corner."

THE December letter from "The Man in the Corner," which is issued to the trade in the interest of the Corbin Cabinet Lock Company, New Britain, Conn., is attractively illustrated and written as usual in a genial vein, which tends to promote the personal element in business which is always so important and influential, and which is in these days often sacrificed owing to the methods of consolidations and great corporations, and the changes which have come in with the new order of things. As showing its spirit and relating to matters of general interest we make the following extracts:

I never watched the passage of a dying year with quite so much regret as the ending of this one affords. Old '99 and I have been pretty good friends, and we have plugged along together amicably, taking the good things that fortune sent us and finding the world a pretty fair place to live in. Nineteen hundred may be as congenial, and probably will be, but "old friends, old books, old wine," are the best after all, and even the wrinkles and imperfections of an old associate are good to look upon.

What will be the complexion of the business of the year to come? Our Philosopher says that he is a very wise man who can at this time make any intelligent forecast of next year's events. American history presents no precedents for gauging the immediate future, and there is little upon which to base a prediction. We are told that the general increase in manufacturing capacity is beginning to have its effect, and that while the phenomenal demand continues, the former universal shortage is somewhat relieved, and the feverish activity is abating. It is also certain that the new contracts for ore and its carriage with the increase in cost of labor

and the large demand will keep iron up, and prevent the prices of manufactured goods from receding, even if there was any good reason for their so doing—which does not appear now.

From my corner I can see no reason why we should not continue indefinitely on the same basis upon which we are now working, with a brief hysterical hiatus next summer and autumn, when the quadrennial madness of the Presidential campaign seizes us, and we drop business to save the country. We think now that we won't; that we will be sensible and let cool reason rule our actions; but it is dollars to doughnuts that when the time comes we will adorn ourselves with gewgaws and, in company with the rest of the world, prance about and shout as usual. It is natural enough that we should do so, and we shall rather enjoy it, but it will not help trade.

Letters from the Trade.

Our readers are invited to discuss in these columns questions of trade interest connected with the manufacture or sale of Hardware. We shall be pleased to have a free expression of opinion on subjects deserving the attention of Hardware merchants and manufacturers.

What Would You Do?

The following letter is from a prominent house who have a large trade and are, we believe, desirable customers in view of the amount of goods they handle, their prompt payments and their businesslike methods. It refers to the manner in which they are being treated by manufacturers with whom they have long had dealings. For a long time a greater independence on the part of manufacturers would in many cases have been desirable, as with a market which for years has been in the buyer's favor the producers of goods have been too ready to make concessions to the neglect of their own interests. It would seem, however, in the cases cited by our correspondent that under the encouragement of unusually active business the manufacturers referred to have been led into the adoption of a short sighted policy. We trust, however, that the instances mentioned are rare exceptions, and invite an expression on the part of the trade on the subject:

Now that prices are away out of sight some of the manufacturers are quite uneasy because their goods are not moving as freely as they would like, and they seem to be forgetting the old time principle of honor between men and are making all kinds of threats.

A CASE IN POINT—A Mixed Paint house, whose line we have handled exclusively for 18 years, are about to take the sale of the goods away from us because we are not selling as many of them as we formerly did. In the first place we all know that when Linseed Oil, during the past two or three years, sold for from 30 to 40 cents per gallon and White Lead from 4 to 5½ cents per pound, it was uphill business to sell what is known as the best Mixed Paints, especially at from \$1.25 to \$1.65 per gallon; and now, since the markets on everything in the building line have advanced to the high water mark, there is little or no building being done—consequently little or no Paint is being used.

This Paint house have a representative traveling through this section who sells their Paint on commission. He carries several side lines. It has been our custom for years to order this Paint by mail order, from the fact that it is more convenient for us to take care of our Paint stock when our demands require it than to give the time to it just when this representative chooses to put in his appearance; consequently, as he claims, he is cut out of his commission. He has therefore caused another dealer to apply for the line and has assured him that if he will order his goods through him he will assure him of the agency. The house in return have permitted themselves to listen to the agent, while they have also allowed them-

selves to be influenced by the falling off of our trade with them during the past several years. We have handled their goods continuously and exclusively, and have always carried a stock of several hundred gallons on hand which is continually kept well assorted. We always discount our bills with this house, as we do with all others.

The party to whom they are about to give the agency recently moved here and we are told has no rating. We understand he has failed twice in the past ten years. Now if you were in our place "what would you do?"

GASOLINE STOVES.—Here is another proposition: We have handled one of the leading makes of Gasoline Stoves for 17 years, during which time we have handled them exclusively. We have always carried a full line on our floor, with a good reserve stock. Last fall when the season closed we as usual had an assortment of about 20 of these Gasoline Stoves on hand. About 30 days ago the representative of this Stove factory called upon us for our spring order; he was fully equipped with his advanced prices. These advances, with the fair stock of Stoves we had on hand, certainly were not productive of any additional ardor on our part. We consequently told him that, since we were fairly well stocked, we would not buy any additional Stoves until the season opened and we could ascertain what to buy. Recently one of our competitors who went out of business after selling out the most of his stock at a closing out sale traded the balance of it for some real estate in some other city; the small lot of plunder that was left has changed hands several times. The man who is now in possession is a stranger here and expects to continue the business. Naturally he is trying to get hold of some of the lines of goods that are established here. To-day we received a letter from our Gasoline Stove manufacturers informing us that another party in our city wants the agency of their goods, and they want to know at once what we propose to do. Now if you were in our place "what would you do?"

A LEADING HOUSE.—In order that you may fully understand the conditions we will frankly state, and without any egotism on our part, that we are considered the leading house in the town. Our rating, as the saying goes, is away up. We have always discounted every dollar of our purchases. The Paint house as above referred to want to turn us down in favor of a party who has no rating and who has failed every time. The Gasoline Stove manufacturer wants to turn us down in favor of a new man with an old worn out stock of goods. We can assure you that the one thing we are holding out for is our rights.

OTHER MANUFACTURERS.—One of the greatest annoyances we have had has been trying to satisfy other Paint manufacturers and Gasoline Stove manufacturers that we were not making a mistake in not taking up their line instead of the lines that we were handling; consequently there will be no trouble in getting other lines if we have to, but it does seem strange that in these apparently prosperous times manufacturers seem to be forgetting all about honor.

We could cite you several other transactions where manufacturers recently, during their sky rocketing of prices, have shown themselves to be utterly devoid of principle, all of which no one would have had occasion to accuse them of when prices were normal and there was no boom on to make them lose their heads and to be utterly devoid of principle.

TO OTHER RETAILERS.—Probably other retailers are experiencing the same trouble that we are having, consequently it might be well if you would explain to the retail trade what their rights are and how much protection they have in having the agency for the sale of a line of goods.

A WESTERN RETAILER.

How to be Ranked as a Jobbing House.

In view of the sharp line that is being drawn by some of the associations or combinations of manufacturers between the wholesale and the retail trade a good deal of interest attaches to the question as to how houses

who are doing more or less of a jobbing trade can obtain recognition as jobbers. The matter is with them one of practical importance and not of mere sentiment or pride, inasmuch as materially better prices are given to those on the jobbers' lists than to those who are simply counted as retailers. The number of inquiries which have come to us on this point indicates the interest with which it is regarded by large retailers or smaller jobbers, who have heretofore in many cases been able to purchase at prices closely approximating those of the large houses. The situation is illustrated in the following letter from a house in Texas:

We have been endeavoring to get our name on the Jobbers' List, but up to the present time we have been unsuccessful. Please to put us on the right track and tell us how. Our purchases amount to about \$50,000 per annum. We pay spot cash for all our goods, and ship considerable stuff to merchants in adjoining towns. We buy nearly all our goods in car lots. Take Barb Wire, for instance. We were asked by the manufacturers \$4.40 per 100 pounds delivered, net cash, and by St. Louis jobbers \$4.35. We finally bought a car from a firm in this State at \$4.30. We can get some Wire in local lots, five spools or more, for \$4.15 from Texas jobbers, which will cost us about \$4.40 laid down in our city. We fail to see how there is any money in Wire while this state of affairs exists.

We have been in the habit of meeting prices of jobbing houses and have made a good profit, but at present the consumer can buy as cheap as we can.

Please give us the desired information in regard to our getting on the Jobbers' List. We know for a fact that we have more capital invested in this business than a good many of the wholesale houses in this State, and think we are entitled to jobbers' prices.

We leave the matter with the trade, and shall be glad to have expressions from manufacturers, jobbers or retailers on this subject, which directly concerns them all.

Selling Retailers Only.

THE OHIO WRINGER COMPANY, Springfield, Ohio, market their entire product of Clothes Wringers through the retailer as a distributing medium, ignoring entirely the middleman. A favorite theory with them is that for their particular product this procedure obtains much better results, in proof of which they recall that a large portion of their trade are customers of 20 years' standing. Among the claims made for their Wringers are their attractiveness, durability, quality, reasonableness in price and the fact that they are withheld from jobbers, and are profitable to exclusive agents, whom only they seek.

Price-Lists, Circulars, &c.

G. W. ROBERTSON, Mexico, Mo.: Klondike Lawn Swing, Comfort Reclining Chair and Planter Gauge and Hoe attachment for Corn Planters.

FRANK L. JONES, Utica, N. Y.: Price list of Cheese Factory, Creamery and Dairy Supplies, &c.

AMERICAN SPRINGLESS LOCK MFG. COMPANY, Kansas City, Mo.: The Springless Lock, both rim and mortise.

THE GOULDS MFG. COMPANY, Seneca Falls, N. Y.: "How, When to Spray and What Pumps to Use," a pamphlet calling attention to their Goulds' Spray Pumps and Nozzles.

HENLEY BICYCLE & ROLLER SKATE WORKS, Richmond, Ind.: Illustrated catalogue of Challenge, Monarch and Henley Ball Bearing Roller Skates, Polo Goods, Skate Sundries and Rink Supplies.

NICOL & Co., 55 and 57 West Washington street, Chicago: Catalogue of Hardware and other Specialties. This is a 64-page catalogue of novelties, embracing a desirable line of salable articles, all of which are specially manufactured by the firm. They comprise Broom Racks, Twine Boxes, Can Openers, Lemon Squeezers, Ice Shaves, Ice

Picks, Nail Boxes, House Numbers, Match Safes, Lamp Stoves, Shoe Punches and Nail Sets, Curling Irons, Curling Iron Heaters and many other articles. The assortment shown is very large and the firm offer special inducements to the trade.

Calendars, Holiday Greetings, &c.

BETHLEHEM STEEL COMPANY, South Bethlehem, Pa.: Illustrated monthly calendar showing some of their leading specialties.

SABIN MACHINE COMPANY, Montpelier, Vt.: A neat paneled board calendar, with illustration in color of "The Old Homestead."

UNION GRANITE COMPANY, Weehawken, N. J.: Calendar calling attention to their Sanitary Laundry Trays, Granite, Slate and Porcelain Wash Trays and Sinks, &c.

CHERRY VALLEY IRON WORKS, Pig Iron, Coal and Coke, Leetonia, Ohio: Calendar with paneled picture, "An Old New England Homestead."

Trade Items.

UNITED STATES STEEL LOCK COMPANY, Clinton, Iowa, have incorporated with a capital stock of \$100,000, \$94,000 paid in. The officers of the company are: D. J. Batchelder, president; J. H. Peters, vice-president and treasurer, and Alexander Cramond, secretary and general manager. The company will continue the manufacture of the Warner Steel Locks and Artistic Hardware.

CLARK MFG. COMPANY, Buffalo, N. Y., have established an agency with J. C. McCarty & Co., 10 Warren street, New York, who are thus in position to take care of the orders of the trade for this well-known line of Hinges—Blind, Shutter, Gate, &c.

GEO. G. ROBERTS, JR., who for the past ten years has been associated with the Atlas Tack Company of Boston and Taunton, Mass., with headquarters at 415 Arch street, Philadelphia, has now become identified with the house of Shelton Company, Shelton, Conn., manufacturers of Tacks, Small Nails, Bolts, &c.

THE HULL & HOYT COMPANY, Danbury, Conn., manufacturers of Indian Tanned Split Leather Aprons for blacksmiths and other mechanics, advise us that during the last year their sales were very large and their trade has extended to every State. These Aprons are known as the "H. & H." Aprons and are made in the following sizes—viz.: No. 1, 26 x 34 inches; No. 2, 28 x 38 inches; No. 3, 30 x 42 inches.

NICOL & Co., manufacturers of Hardware Specialties and Novelties, 55 and 57 West Washington street, Chicago, have entered their twentieth year in the manufacture of patented Hardware Specialties and have decided to inaugurate a new policy, which is to give the exclusive agency for the sale of their goods to but one responsible firm in each town. They are sending out blank forms to the trade for this purpose. In making a discount they guarantee that no other house in the United States will be able to buy at a lower rate.

THE BARNEY & REED MFG. COMPANY, Boston, have been reorganized with the following officers: George S. Boutwell, formerly of Boutwell & Co., president; A. W. Reed, who has been connected with the management of the company from the first, treasurer. This company are the well-known manufacturers of the Walda Sectional Window Weights, which, we are advised, are having an extensive sale throughout the Eastern States and in foreign countries, notably Germany and Holland. They are making extensive preparations for handling a much larger business and are now turning out the Weights both round and square. Many prominent buildings in Boston and vicinity, including the new terminal station, are equipped with these Weights, which, it is stated, hang exactly in the center, require only 10-inch pockets and eliminate the use of Lead Weights. The point is made that the Hardware dealer with one-sixth the stock required for one piece Weights can fill any order. The Walda Weights are crated 100 pounds in a box.

C. R. MCCAREY, who for five or six years has been identified with the house of John H. Graham & Co., New York, is going to Cuba January 20 to assume charge of the Hardware department of the Gomez-O'Brien Company, located at O'Reilly 17, Havana, whose New York office is at 234 Broadway. For this department the house export Plumbers' Supplies, Sugar Plantation Machinery, Refrigerators and Ice Making Plants, &c.

FROM the special notice on another page it will be observed that the Lackawanna Hardware Company, Scranton, Pa., have decided to retire from business. Their

stand, which is referred to as well established and doing a nice trade, is offered for sale.

DURING the past two months the Star Corundum Wheel Company, Detroit, Mich., have established the following agencies for their products: H. A. Heppner & Co., Portland, Ore.; Standard Supply & Equipment Company, Pittsburgh; Monroe Brass & Wire Company, Cincinnati, and W. C. Heimbuecher, 86 La Salle street, Chicago. The company are manufacturers of Corundum and Emery Wheels.

ARTHUR T. RUTTER, for many years identified with the late William S. Fearing, 256 Broadway, New York, has succeeded to the business, which he is carrying on at the same address. Mr. Rutter's line includes Sheet Brass, German Silver, Copper, Brass and German Silver Wire, Brass and Copper Tubes (small Tubing a specialty), Brass and Copper Rods, Brass Ferrules, Sheet and Ingot Copper, Spelter, Tin, Antimony, Lead, &c.

Among the Hardware Trade.

Leecraft & King are successors to H. N. Roberts in the Hardware, Stove and Agricultural Implement business at Colbert, I. T.

W. F. Stoll is enlarging his Hardware store at Chicago Heights, Ill.

Chas. A. Watts has succeeded A. P. Jacobs in the Hardware, Stove, Farm Implement and Sporting Goods business at Paullina, Iowa.

W. S. Walters, Afton, Iowa, has disposed of his Hardware and Farm Implement business to Barnhouse & Carl, who will continue at the old stand.

S. T. Rhode, dealer in Hardware, furniture, &c., has disposed of his furniture stock.

A. J. Minor & Sons are successors to A. J. Minor, Hardware and Lumber dealer, Nelson, Neb.

Benj. F. Riley, wholesale and retail Hardware and Manufacturers' Supplies, Chester, Pa., will shortly commence the erection of a three-story building, the third floor of which will be used as a meeting room.

The storehouse of Clancy Bros., wholesale and retail Shelf and Heavy Hardware, Syracuse, N. Y., was destroyed by fire on the 20th ult. The damage was in the neighborhood of \$6000. Their store was not injured.

Kessler Hardware Company, Seymour, Ind., have incorporated with a capital stock of \$7000. They will continue the business established many years ago by John L. Kessler. The company consists of Mr. Kessler, his son, taken into the firm as a partner a few years ago, and a former clerk. The business will be managed as heretofore, and the company will buy for cash only.

After 20 years' active and successful business in their present location James Armstrong & Son, dealers in Hardware, Farm Machinery, Vehicles, &c., Dyersville, Iowa, have leased their buildings and sold and transferred their stock and good will to Reiff & Friedman, who will continue the business on much the same lines as in the past.

O. G. Devenish Company are successors to L. J. Linley, Pullman, Wash.

C. Colby, Mount Vernon, S. D., has lately admitted a partner in his business, and the style is now Colby & Diehl.

H. E. Oxley is now carrying on the Hardware and Agricultural Implement business formerly conducted by H. H. Behmerwhold, Pleasant Dale, Neb.

Birdsey & Raven have succeeded the old firm of Birdsey & Foster, established over 30 years ago at Meriden, Conn. The business is principally retail, but some jobbing is done with country stores and factories. Mr. Foster died in November last.

Valentine & Wolzmouth, Spearfish, S. D., have lately moved into their new store, 40 x 100 feet, two stories high. The store has been fitted with the patented shelving furnished by the John D. Warren Mfg. Company of Chicago. The firm refer to the business of the past year as exceeding any in their history.

L. F. Stahler is successor to Stahler Bros., dealers in Hardware, Stoves, Harness, Farm Implements, Vehicles, &c., Waverly, Ohio. This business was established in 1867 by David Stahler.

About \$75 worth of goods were stolen from the store of Oman Hardware & Lumber Company, Spokane, Wash., on the 29th ult.

E. H. Cheever has lately entered the retail Hardware, Stove, Tinware, Farm Implement and Sporting Goods business at Langlois, Ore.

Sams & Warnick, Hardware merchants, Warrensburg, Mo., have dissolved partnership. The stock has been divided and E. N. Warnick has formed a partnership with his brother under the style of Warnick Bros., in a new location. B. T. Sams will continue at the old stand under his own name.

An attempt was recently made to rob the store of O. M. Scott & Bro., Marysville, Ohio, but the burglar was caught in the act and marched off to jail.

McClung & Doty Hardware Company have succeeded McClung Hardware & Furniture Company, Jamesport, Mo.

The furnace shop part of the Hull & Hoyt Company's business at Danbury, Conn., was damaged by fire on the night of the 31st ult. The general business continued uninterrupted, however, and the shop was opened two days later, the loss being adjusted the following day.

Mount Calm Hardware Company, Mount Calm, Texas, have incorporated with a capital stock of \$5000.

Buchanan & Townsend have succeeded J. J. Buchanan in the Hardware and Farm Implement business at Hastings, Neb. A wholesale and retail trade is carried on. The amount of business done during 1899 was about \$65,000. They have an establishment 176 x 50 feet, two stories high.

Benjamin Hardware Company is the style of a new concern at Texarkana, Texas, with a capital stock of \$10,000.

J. N. Barron has purchased the Hardware stock of D. H. Grant, Raymore, Mo., and will continue at the old stand.

D. Robertson, dealer in Hardware and Implements, Conde, S. D., has taken in a partner, and the style is now Robertson & Smith.

T. W. Bleach has succeeded Phillips & Bleach in the retail Hardware, Stove, Farm Implement and Plumbing business at Kearney, Mo.

W. Harvey Smith has succeeded L. L. Brentner, Jr., at Norwalk, Cal. Mr. Smith has doubled the size of his store room and added materially to the stock.

Oliver-Nussbaum-Scharff Company, Groesbeck, Texas, have been incorporated by D. Oliver, S. Nussbaum and L. Scharff with a capital stock of \$10,000.

G. M. Webber, East Bridgewater, Mass., dealer in Stoves, Hardware, Tinware, Furnaces, Plumbing Goods, &c., is expecting to enlarge his establishment for the purpose of adding a line of Furniture.

The Hardware and Implement firm of Lyken & Erogen, Cogswell, N. D., have been succeeded by Lyken & Napstad. The firm will open branch stores at Lidgerwood, N. D., and Veblin, S. D.

Seed Cases.

W. C. Heller & Co., Montclair, N. J., have put on the market the seed case here illustrated. Four sizes of this style are made and carried in stock for immediate shipment. They are said by the manufacturers to be thoroughly mice and insect proof. Each case has a sheet metal back, so insects and animals cannot enter from the rear, and a steel division between each box so seeds cannot get mixed, the cases themselves being equipped with steel seed drawers, the fronts of which have solid bronze drawer pulls and card clips. One size, No. 1730, contains 57 steel drawers 10 inches long. The case is 28 inches wide, 54 inches high and 11 inches deep, weighs 175 pounds and measures 17 cubic feet. No. 1734 has the

same number of steel drawers and same width and height, but is 15 inches deep, the drawers being 14 inches long. This case weighs 200 pounds and measures 20 cubic feet. The cases are made regularly of white wood, varnished, painted any color, or stained cherry, oak, mahogany or



Seed Case, with Sheet Steel Drawers and Partitions.

walnut. If wanted in solid oak, cherry, maple or birch a special price will be quoted.

Bundy Bicycle Lamp.

Frank E. Bundy Lamp & Sundry Company, Elmira, N. Y., are manufacturing the Model C Bundy bicycle lamp, as here illustrated. It is built on somewhat similar

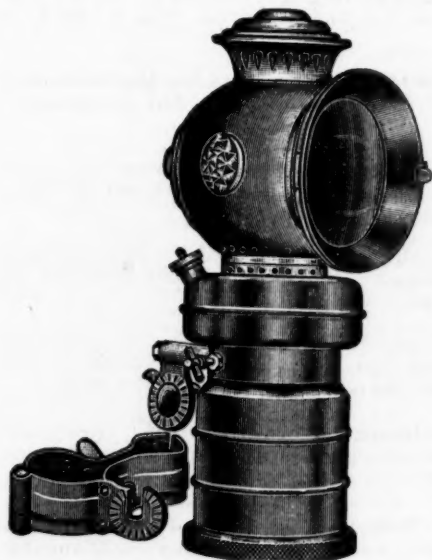


Fig. 1.—Model C Bundy Bicycle Lamp.

lines to their Model B lamp, in which carbide cartridges are used, the Model C being designed to burn $\frac{1}{8}$ -inch commercial carbide by means of an enlarged carbide chamber. Other features are an improved moisture ac-

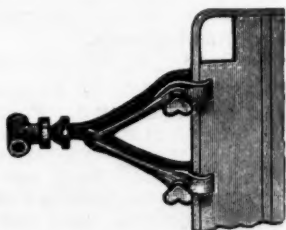


Fig. 2.—Carriage Attachment for Lamp.

cumulator, detachable fish tail tip and holder, removable double convex lens, removable parabolic reflector, large jewels ground and polished and combination bracket.

The lamp is polished and nicked and is said to have a capacity of five hours. Fig. 3 is a carriage attachment for securing the lamp to the dashboard of a vehicle.

Myers' Combination Pumping Jack.

F. E. Myers & Bro., Ashland, Ohio, are manufacturing the Myers Combination pumping jack, as here illustrated. This device is attached to a common pump standard and is rigged for belt power for operation by gas, steam or other engine. This pumping jack is self contained, being fitted with face plate, with an adjustable stroke of 5, $7\frac{1}{2}$ or 10 inches. This, in connection with the adjustable walking beam, allows of a stroke varying from 3 to 16 inches. The periphery of the face plate is fitted with cogs, which engage a pinion operating a 65 pound balance wheel. The motion of this balance wheel carries the piston over the dead points in a regular movement and prevents the rebounding of the horse-power lever, an im-



Myers' Combination Pumping Jack for Power.

portant advantage said to be peculiar to this jack. It will be seen there is a loose pulley, the balance wheel operating as a tight pulley, these pulleys being 12 inches in diameter and $3\frac{1}{2}$ inches face. The concern also make a similar device, the same in every respect except that it is intended to be used in connection with horse-power or wind mill or both combined. It is often the case that a wind mill is not available owing to lack of wind, in which event the Myers Combination pumping jack can be attached to the pump standard and be operated by horse-power by detaching the wind mill, thus being able to alternate wind mill or horse power as occasion requires, while in addition the pump can be operated by hand independent of the various kinds of power. The pumping jack can be supplied either with or without stand, and is designed to be used in connection with any ordinary pump standard.

A. A. Anderson has disposed of his Hardware store in Juneau, Alaska, and will enlarge his store at Skaguay, to which he will hereafter devote his entire attention. Mr. Anderson handles in a wholesale and retail way Shelf and Heavy Hardware, Stoves and Tinware, Sporting Goods, Bicycles, Fishing Tackle, Steam Fittings, Saddlery Hardware, Chandlery, &c. His building is a new one, with plate front, and cost \$3500. It is 28 x 70 feet, two stories high.

New Hand Lever Pump.

Gleason-Peters Air Pump Company, 20 West Houston street, New York, have just put on the market the new hand lever pump for bicycles and pneumatic tired wagons here illustrated. Fig. 1 shows the pump itself, Fig. 2 indicating the method of using it. The cylinder of brass is $1\frac{1}{2}$ x 10 inches, has a capacity of 17 cubic inches, a pres-



Fig. 1.—Portable Hand Lever Pump.

sure per square inch of 250 pounds and is 17 inches over all in length, the entire article being nickel plated. The pump can be operated by hand without being attached to supports, is small and light in construction, handles of malleable iron and all joints soldered. The main feature to which the makers draw attention is the high pressure and little energy required to obtain it. A child, it is said, can inflate a tire to 250 pounds pressure per square inch



Fig. 2.—Method of Using Pump.

with it, as the small cylinder and powerful toggle joint require a small amount of exertion. It can be put under the seat of a small runabout.

Slaters' and Tinnerns' Roofing Nails.

The Salem Nail Company, 79 Pearl street, New York, established in 1850 by Admiral Nelson, and later the property of Wilbur & Potter, are now the property of John A. Wilbur. The company say they have made a specialty of making the best possible nails for the different purposes for which they are required, and have recently issued a circular to the trade calling attention to their galvanized and tinned nails for tinnerns and slaters. It is pointed out that when these nails are protected by galvanizing the durability of a nail is established to such an extent that there is no danger of their rusting off in the wood as long as the slate or tin which they secure to the timbers is fit for service. The roofing nails for slaters are made with large heads, which do not break off, and are furnished both of the round type and also of the cut nail finish. The tin roofers' nails made of round wire are barbed so as to make them hold securely in the wood. These nails are furnished either black or tinned, but it is noticed that the growing tendency in the trade is for the use of the better grade of nails. Pure zinc, copper and yellow metal nails are also made for roofing and various other purposes, for boat building and for securing sheathing to piling or the bottoms of vessels. Another specialty is a long nail

made of both copper and lead, designed for fastening slates to the purlins of iron roofs, the intention being to bend the lower end around the iron purlins, the lead nails being specially designed for use in buildings where the acid fumes would destroy other metals. The house issue a unique nail price-list, giving the various styles, lengths and sizes of nails and the prices. This circular is one of their own devising and intended to give as much information as is possible in reference to standard goods.

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REVISED JANUARY 16, 1900.

B. L. Caps (Sturtevant Shells) \$1.00
All other primers.....\$1.10@1.15

Carpet Stretchers—

See Stretchers, Carpet.

Cartridges—

B. B. Caps, Con. Ball Ssgd. \$1.90
B. B. Caps, Round Ball.....\$1.10@1.15
Blank Cartridges:
33 C. F., \$5.50.....10¢
33 C. F., \$7.00.....10¢
33 cal. Rim, \$1.50.....10¢
32 cal. Rim, \$2.75.....10¢
Central Fire.....35¢
Pistol and Rifle.....15¢
Primed Snells and Bullets.....15¢
Rim Fire Sporting.....50¢
Rim Fire, Military.....15¢

Casters—

Red.....60¢
Flat.....60¢
Plate, part Brass.....60¢
Philadelphia.....60¢
Martin's Patent (Phoenix).....60¢
Payson's Anti-Friction Furniture.....70¢
Payson's Anti-Friction Truck.....70¢
Standard Ball Bearing.....45¢
Tucker's Patent, low list.....45¢

Cattle Leaders—

See Leaders, Cattle.

Chain—

American Coil, Full Casts:
3-16 1/4 5-16 3/8 7-16 1/2 9-16 5/8
8-16 3/4 5-8 6-00 4-8 4-75 4-65
1/2 1 inch.
4-65 4-60 4-40 4-40 cents per lb.
Less than Cash lots add 1/4¢ per lb.
German Coil, list July 2, '97
60¢@10¢@60¢@10¢
German Hatter Chain, list July 2, '97
60¢@10¢@60¢@10¢
Trace, Wagon and Fancy Chains
list April, '98.....60¢@10¢@50¢@10¢
Jack Chain, list July 10, '98:
Iron.....60¢
Brass.....60¢
Gal. Pump Chain.....60¢
Breast, Hitching and Rein Chains.
Covert Sash Works.....50¢
Covert Mfg. Co.:
Breast.....35¢
Halter.....35¢
Heel.....35¢
Rein.....35¢
Stallion.....35¢
Onella Company:
Eureka Coil and Halter.....60¢@40¢
Niagara Coil and Halter.....60¢@40¢
Niagara Cow Ties.....45¢@45¢@10¢
Am. Coil and Halters.....50¢@10¢@50¢
Am. Cow Ties.....35¢@40¢
Am. Goods Co.:
Dog Chain.....60¢
Universal Dbl-Jointed Chain.....45¢

Chalk—(From Jobbers.)

Carpenters', Blue.....gro. 45¢
Carpenters', Red.....gro. 35¢
Carpenters', White.....gro. 30¢
See also Crayons.

Chalk Lines—See Lines.

Checks, Door—

Bardsley's.....40¢@10¢
Columbia.....50¢@10¢
Eclipse.....50¢@10¢

Chisels—

Socket Framing and Firmer
Standard List.....70¢@10¢@75¢@10¢
Buck Bros.....30¢
Charles Buck.....30¢
Swan's.....70¢@10¢@25¢
L. & L. J. White.....30¢@30¢

Tanged—

Tanged Firmers.....40¢@10¢@40¢@10¢
Buck Bros.....30¢
Charles Buck.....30¢
L. & L. J. White, Tanged.....25¢@5¢

Cold—

Cold Chisels, good quality lb. 1 1/2@16¢
Cold Chisels, fair quality.....lb. 12¢
Cold Chisels, ordinary.....lb. 8¢@9¢

Chucks—

Beach Pat., each \$8.00.....20¢
Skinner Patent Chucks:
Combination Lathe Chucks.....40¢
Drill Chucks, Patent and Standard 3/8"
Drill Chucks, New Model.....2 1/2¢
Independent Lathe Chucks.....40¢
Improved Planer Chucks.....20¢
Universal Lathe Chucks.....40¢
Face Plate Jaws.....35¢
Union Mfg. Co.:
Combination.....40¢
Car Drill.....30¢
Geared Scroll.....40¢
Independent.....40¢
Union Drill.....30¢
Universal.....30¢
Face Plate Jaws.....35¢

Clamps—

Adjustable, Hammer's.....20¢@90¢
Adjustable, Stearns'.....30¢
Cabinet, Sargent's.....45¢@10¢
Carriage Makers', P. S. & W. Co. 40¢@10¢
Carriage Makers', Sargent's.....30¢@10¢
Beav. Parallel.....30¢@10¢
Lideman's, Udon Drop Forc. & Tool
Co.....40¢
Saw Clamps, see Vises, Saw Vises.

Cleaners, Walk—

Star Shank, All Steel.....\$4.00 net
Star Shank, All Steel.....\$3.75 net

Cleavers, Butchers—

Foster Bros.....30¢
New Haven Edge Tool Co.'s.....40¢@40¢
Nichols Bros., Flat hdl., 30"; Rd. hdl., 40"
Fayette R. Plumb.....30¢
P. S. & W.....30¢@50¢
L. J. White.....35¢

Clippers—

Chicago Flexible Shaft Company
Handy Toilet.....\$7.50

Mascotte Toilet.....\$3.40
Monitor Toilet.....\$2.00
Stewart's Patent.....\$10.00

Clips, Axle—

Eagle and Superior 1/4 and 5-16
inch.....65¢@10¢@70¢
Norway, 1/4 and 5-16 inch.....65¢@10¢@70¢

Cloth and Netting, Wire

—See Wire, &c.

Cocks, Brass—

Hardware list (Globe, Kerosene,
Lever Bibbs, Racking, &c.)
60¢@10¢@60¢@10¢

Coffee Mills—See Mills, Coffee.

Collars Dog—

Brass, Pope & Stevens' list.....40¢
Embossed, Gilt, Pope & Stevens' list 80¢@10¢
Leather, Pope & Stevens' list.....40¢

Compasses, Dividers, &c.

Ordinary Goods.....70¢@10¢@75¢
Bemis & Call Hdw. & Tool Co.:
Dividers.....65¢
Callipers, Call's Patent Inside.....55¢
Callipers, Double.....65¢@10¢
Callipers, Inside or Outside.....65¢@10¢
Callipers, Wagon.....60¢
Compasses.....50¢
J. Stevens A. & T. Co.....35¢@10¢

Conductor Pipe, Galva-

nized—
Territory.....Carload.....L. C. L.
Eastern.....60¢@25¢@15¢
Central.....60¢@25¢@15¢
Southern.....60¢@25¢@15¢
S. Western.....60¢@25¢@15¢
Terms, 2% for cash.
See also Eave Trough.

Coolers, Water—

S. S. & Co.: 2-gal., \$14.00; 3-gal.,
\$16.00; 4-gal., \$18.50; 6 gal., \$23.00.

Coopers' Tools—

See Tools, Coopers'.

Cord—Sash—

Braided, Drab.....lb. 22¢@5¢
Braided, White, Common.....lb. 18¢@15¢
Cable Laid Italian.....lb. 18¢@15¢
Common India.....lb. 8¢@9¢
Cotton Sash Cord, Twisted.....lb. 12¢@10¢
Patent Russia.....lb. 12¢@10¢
Cable Laid Russia.....lb. 12¢@10¢
India Hemp, Braided.....lb. 16¢@15¢
India Hemp.....lb. 10¢@12¢
Patent India.....lb. 10¢@12¢
Pearl Braided, cotton.....lb. 20¢
Massachusetts, White.....lb. 18¢@15¢
Massachusetts, D-ab.....lb. 24¢
Eddystone Braided Cotton.....lb. 19¢
Harmony Cable Laid Italian.....lb. 18¢
Ossawa Mills:
Crown, Solid Braided White.....lb. 18¢
Braided, Giant, White.....lb. 17¢
Peerless:
Cable Laid Italian.....lb. 16¢
Cable Laid Russian.....lb. 14¢
Cable Laid India.....lb. 12¢
Braided India.....lb. 18¢
Phoenix, White.....lb. 18¢

Braided, Drab Cotton—

Braided, Italian Hemp.....lb. 31¢
Braided, Linen.....lb. 44¢
Braided, White Cotton, Spot.....lb. 27¢
Silver Lake:
A quality, Drab, 40¢.....lb. 15¢
A quality, White, 35¢.....lb. 15¢
B quality, Drab, 35¢.....lb. 15¢
B quality, White, 30¢.....lb. 15¢
Italian Hemp, 40¢.....lb. 15¢
Linen, 67¢.....lb. 15¢

Wire, Picture—

Braided or Twisted.....70¢@70¢
Corn Knives and Cutters
—See Knives, Corn.

Crackers, Nut—

Little 'lan'.....\$24.00
Turner & Seymour Mfg. Co.....50¢

Cradles—

Grain.....50¢

Crayons—

White Round Crayons, gross.....5¢@6¢
Cases, 100 gro., \$1.50@5.00, at fac-
tory.
Metal Workers' Crayons.....gr. \$2.50
Soapstone Pencils, round, flat or
square.....gr. \$1.50
Rolling Mill Crayons.....gr. \$2.50
Raised Crayons (composition).....gr. \$2.00

See also Chalk.

Creamery Pails—See Pails,

Creamery.

Crooks, Shepherds—

Fort Madison, Heavy.....\$7.00
Fort Madison, Light.....\$6.50

Crow Bars—See Bars, Crow.

Cultivators—

Victor Garden.....\$10.00

Cutters—

Glass—
Smith & Hemmaway Co.....80¢
Meat—
American.....1 2 3 4 5 6
Nos.....\$5 \$7 \$10 \$15 \$20 \$25
Each.....\$1.75 2.25 3.00 4.00 5.50 6.50
Enterprise.....\$2.50@7.50
Nos.....5 10 12 22 30
Each.....\$2 \$3 \$2.50 \$4 \$5
Dixon's.....\$2.50@1.00
Nos.....2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50 51 52 53 54 55 56 57 58 59 60 61 62 63 64 65 66 67 68 69 70 71 72 73 74 75 76 77 78 79 80 81 82 83 84 85 86 87 88 89 90 91 92 93 94 95 96 97 98 99 100
Hale's.....\$14.00 \$17.00 \$19.00 \$20.00 \$23.00
Hale's.....\$11.00 \$12.00 \$13.00 \$14.00 \$15.00 \$16.00 \$17.00 \$18.00 \$19.00 \$20.00 \$21.00 \$22.00 \$23.00 \$24.00 \$25.00 \$26.00 \$27.00 \$28.00 \$29.00 \$30.00 \$31.00 \$32.00 \$33.00 \$34.00 \$35.00 \$36.00 \$37.00 \$38.00 \$39.00 \$40.00 \$41.00 \$42.00 \$43.00 \$44.00 \$45.00 \$46.00 \$47.00 \$48.00 \$49.00 \$50.00 \$51.00 \$52.00 \$53.00 \$54.00 \$55.00 \$56.00 \$57.00 \$58.00 \$59.00 \$60.00 \$61.00 \$62.00 \$63.00 \$64.00 \$65.00 \$66.00 \$67.00 \$68.00 \$69.00 \$70.00 \$71.00 \$72.00 \$73.00 \$74.00 \$75.00 \$76.00 \$77.00 \$78.00 \$79.00 \$80.00 \$81.00 \$82.00 \$83.00 \$84.00 \$85.00 \$86.00 \$87.00 \$88.00 \$89.00 \$90.00 \$91.00 \$92.00 \$93.00 \$94.00 \$95.00 \$96.00 \$97.00 \$98.00 \$99.00 \$100.00
Home No. 1.....\$37.00 \$38.00 \$39.00 \$40.00 \$41.00 \$42.00 \$43.00 \$44.00 \$45.00 \$46.00 \$47.00 \$48.00 \$49.00 \$50.00 \$51.00 \$52.00 \$53.00 \$54.00 \$55.00 \$56.00 \$57.00 \$58.00 \$59.00 \$60.00 \$61.00 \$62.00 \$63.00 \$64.00 \$65.00 \$66.00 \$67.00 \$68.00 \$69.00 \$70.00 \$71.00 \$72.00 \$73.00 \$74.00 \$75.00 \$76.00 \$77.00 \$78.00 \$79.00 \$80.00 \$81.00 \$82.00 \$83.00 \$84.00 \$85.00 \$86.00 \$87.00 \$88.00 \$89.00 \$90.00 \$91.00 \$92.00 \$93.00 \$94.00 \$95.00 \$96.00 \$97.00 \$98.00 \$99.00 \$100.00
Little Giant.....\$35.00 \$36.00 \$37.00 \$38.00 \$39.00 \$40.00 \$41.00 \$42.00 \$43.00 \$44.00 \$45.00 \$46.00 \$47.00 \$48.00 \$49.00 \$50.00 \$51.00 \$52.00 \$53.00 \$54.00 \$55.00 \$56.00 \$57.00 \$58.00 \$59.00 \$60.00 \$61.00 \$62.00 \$63.00 \$64.00 \$65.00 \$66.00 \$67.00 \$68.00 \$69.00 \$70.00 \$71.00 \$72.00 \$73.00 \$74.00 \$75.00 \$76.00 \$77.00 \$78.00 \$79.00 \$80.00 \$81.00 \$82.00 \$83.00 \$84.00 \$85.00 \$86.00 \$87.00 \$88.00 \$89.00 \$90.00 \$91.00 \$92.00 \$93.00 \$94.00 \$95.00 \$96.00 \$97.00 \$98.00 \$99.00 \$100.00

Miles' Challenge, \$ doz.....45¢@45¢@10¢
Nos.....1 2 3
\$22.00 \$30.00 \$40.00
New Triumph No. 605, \$ doz.....\$24.00

Woodruff's, \$ doz.....40¢

Nos.....100 150
\$15.00 \$18.00
Chadborn's Smoked Beef Cutter, \$ doz.....\$80.00
Enterprise Beef Shavers.....25¢@30¢

Slaw and Kraut—

Henry Diss'on & Son:
Slaw, C r n Grater.....40¢
Kraut Cutters 24 x 7, 26 x 8, 30 x 9, 36 x 12, 40 x 12.....40¢
Kraut Cutters 24 x 7, 26 x 8, 30 x 9, 36 x 12, 40 x 12.....40¢
Tucker & Dorsey Mfg. Co.:
Kraut Cutters.....50¢@50¢@10¢
Slaw Cutters, 1 Knife, \$ gr.....\$15¢@18¢
Slaw Cutters, 2 Knife, \$ gr.....\$20¢@27¢

Tobacco—

All Iron, Cheap.....doz. \$1.25@1.50
Enterprise.....25¢@30¢
National, \$ doz.....\$31.00.....40¢
Sargent's, \$ doz.....\$24.00.....60¢@60¢@10¢

Washer—

Appleton's, \$ doz.....\$16.00
60¢@10¢@60¢@10¢@10¢
Bonney's.....\$ doz. \$4.75

Diggers, Post Hole, &c.—

Iwan's Improved Post Hole Digger.....40¢
Iwan's Perfection Post Hole Digger.....\$ doz. \$10.00
Never-Break Post Hole Diggers, \$ doz.
\$24.00.....60¢
Samson, \$ doz. \$34.00.....25¢

Dividers—See Compasses.

Dog Collars—See Collars, Dog.

Door Checks—

See Checks, Door.

Door Springs—

See Springs, Door.

Drawers, Money—

Tucker's Pat. Alarm Till No. 1, \$ doz.
\$18; No. 2, \$12; No. 3, \$11; No. 4, \$12.

Drawing Knives—

See Knives, Drawing.

Drills and Drill Stocks—

Common Blacksmiths' Drill, each
\$1.75@2.00
Blacksmiths' Self-feeding.....each
\$3.75@4.00
Bench Drills, Stearns'.....50¢
Bench, Millers Falls, each \$3.00.....15¢@10¢
Bench, P. S. & W.....30¢@30¢@10¢
Goodell Automatic Drills, 40¢@5¢@40¢@10¢
Ratchet, Curtis & Curtis.....25¢
Ratchet, Parker's.....40¢
Ratchet, Weston's.....20¢@25¢
Ratchet, Whitney's, P. S. & W.....40¢@10¢
Whitney's Hand Drill, No. 1, \$10.00.
Adjustable, No. 10, \$12.00.....33¢

Twist Drills—

Standard List.....65¢@65¢@10¢
Drill Bits or Bit Stock
Drills—See Augers and Bits.

Drill Chucks—See Chucks.

Dripping Pans—

See Pans, Dripping.

Drivers, Screw—

Balsey's Screw Holder and Driver, \$ doz.
2 1/2-inch, \$8; 4-inch, \$7.50 6-inch, \$9.40
Buck Bros.....30¢
Buck Bros' Screw Driver Bits.....27¢
Champion.....40¢@10¢
Douglass Mfg. Co.....20¢@20¢@10¢
Fray's Hol. H'dle Sets, No. 3, \$12.00 50¢
Gay & Parsons' Ratchet.....35¢
Goodell's Automatic.....50¢@10¢@50¢@10¢@10¢
Mayhew's Black Handle.....50¢
Mayhew's Monarch.....45¢@10¢
New England Specialty Co.....50¢@10¢
Sargent & Co.'s:
Nos. 1, 50, 55 and 60, 50¢@10¢@50¢@10¢
Nos. 20 and 40.....50¢@10¢@10¢
Screw Driver Bits.....\$ doz. 50¢@70¢
Stanley's R. & L. Co.'s:
No. 64, Varnished Handles.....60¢@10¢
No. 86.....70¢@10¢
Swan's:
Nos. 65 to 68.....50¢
Nos. 69, 70 and 71.....40¢@10¢
Nos. 72, 73 and 74.....30¢@10¢@10¢

Eave Trough, Galvanized

Territory.....Carload.....L. C. L.
Eastern.....75¢@15¢
Central.....75¢@12¢
Southern.....75¢@10¢
S. Western.....75¢@2¢
Terms, 2% for cash.
See also Conductor Pipe.

Egg Beaters—See Beaters, Egg.

Emery—Nos. 4 to 54 to Flour, CF

46 gro. 1.80 gro. FFF
Kegs.....lb. 4¢
1/2 Kegs.....lb. 4¢
1/4 Kegs.....lb. 5¢
10-lb cans.....6¢
10-lb cans, less
than 10.....10¢
10 c 10 c 8c

Enameled and Tinned

Ware—See Ware, Hollow.

Escutcheon Pins—

See Pins, Escutcheon.

Extractors, Lemon Juice
—See Squeezers, Lemon.

Fasteners, Blind—

Zimmerman's.....50¢@10¢

Faucets—

Cork Lined.....70¢@5¢@70¢@10¢
Metallic Key, Leather Lined.....70¢@10¢
Red Cedar.....60¢@50¢
B. & L. B. Co.:
West's Lock, Open and Shut Key 50¢@10¢
John Sommer's Peerless Tin Key.....40¢
John Sommer's Boss Tin Key.....50¢
John Sommer's Victor Metal Key.....50¢
John Sommer's Duplex Metal Key.....60¢
John Sommer's Diamond Lock.....40¢
John Sommer's I. X. L. Cork Lined.....50¢
John Sommer's Reliable Cork Lined.....50¢@10¢

John Sommer's Common Cork Lined.....50¢@10¢

John Sommer's Chicago Cork Lined.....60¢
John Sommer's O. K. Cork Lined.....50¢
John Sommer's Perfection Cedar.....60¢
Star.....60¢@60¢
Star, Metal Plug new list.....40¢@40¢
Lockport, Metal Plug, reduced list 60¢@5¢
Self Measuring:
Enterprise, \$ doz. \$36.00.....40¢
Lane's, \$ doz. \$36.00.....33¢
National Measuring, \$ doz. \$36.00.....40¢

Felice Plates—

See Plates, Felice.

Files—Domestic—

List revised Nov. 1, 1899.
Best Brands.....70¢@75¢
Good Brands.....75¢@75¢@10¢
Fair Brands.....75¢@10¢@50¢@10¢
Second Quality.....80¢@10¢@30¢@10¢

Imported—

Stubbs' Tapers, Stubbs' list, July 2,
'97.....35¢

Fixtures, Grindstone—

Net Prices:
Inch.....15 17 19 21 23
Per doz. \$3.50 5.55 5.75 4.50 5.25
Stowell's Giant Grindstone Hanger.....\$ doz. \$6.00
Stowell's Grindstone Fixtures.....50¢
P. S. & W. Co.....50¢@10¢
Reading Hardware Co.....80¢@10¢
Sargent's Patent.....60¢@10¢@60¢@10¢

Fluting Machines—

See Machines, Fluting.

Fodder Squeezers—

See Squeezers, Fodder.

Forks—

Aug. 1, 1899, list.
Hay, 2 tine.....65¢
Hay, 3 tine.....65¢
Manure, 4 tine.....70¢

Gimlets—

Nail, Metal, Assorted, gro. \$1.40@1.75
 Spike, Metal, Assorted, gro. \$3.00@3.50
 Nail, Wood Handled, Assorted,
 gro. \$4.00@4.50
 Spike, Wood Handled, Assorted,
 gro. \$5.00@5.25

Glass, American Window

List Nov. 18, 1898.

Small lots from store:
 Eastern.....80¢@100¢@200¢
 Western.....80¢@100¢@200¢
 From Jobbers or Factory, with Freight
 Allowance:

Carloads, Single Strength.....90¢
 Carloads, Double Strength.....90¢@100¢

Glue—Liquid, Fish—

List A, Bottles or Cans, with Brush.

List B, Cans (½ pts., pts., qts.).....37½¢@50¢

List C, Cans (½ gal., gal.).....25¢@45¢

Glue Pots—See Pots, Glue.**Grease, Axle—**

Common Grade.....gro. \$5.00@6.00

Allerton's Axle.....

10 Tins, 5 gr. \$2.00; 5 lb. \$3.00;

10 lb. \$6.00.

25 lb wood pails.....\$ doz. \$12.00

Dixon's Everlasting.....10 lb pails, ea. 85¢

Dixon's Everlasting, in bxs. \$ doz. 1 lb

\$1.20; 2 lb \$3.00.

Grindstone Fixtures—

See Fixtures, Grindstone.

Gun Powder—See Powder.**Hack Saws—See Saws.****Hafts, Awl—**

Peg Patent, Leather Top.....gro. \$4.90@5.25

Peg Patent, Plain Top.....\$3.50@3.75

Sewing, Brass Ferrule.....\$1.50@1.60

Saddlers' Brass Ferrule.....\$1.35@1.45

Peg, Common.....\$1.25@1.35

Brad, Common.....\$1.50@1.75

Halters and Ties—

Covert Mfg. Co., Web.....45¢@25¢

Covert Mfg. Co., Jute Rope.....45¢@25¢

Covert Mfg. Co., Sisal Rope.....30¢@25¢

Covert's Saddlery Works, 98 list, W. b. 10

Covert's Saddlery Works, Leather 80¢@100¢

Covert's Saddlery Works, Jute.....60¢@100¢

Covert's Saddlery Works, Sisal.....60¢@100¢

Covert's Saddlery Works, Manila.....60¢@100¢

Covert's Saddlery Works, Cotton.....70¢@100¢

Hammers—**Handled Hammers—**

Haller's Machinists'.....40¢@45¢

Magnetic Tack, Nos. 1, 2, 3, 4, 5, 6, 7, 8, 9, 10

Peas, Stow & Wilcox.....40¢@45¢

Payette R. Plumb:

Artisans' Choice, A. E. Nail.....33½¢@55¢

Engineers' and B. S. Hand.....60¢@100¢

Machinists' Hammers, Sisal.....60¢@100¢

A. E. & A. E. Bell Face Nail.....33½¢@55¢

Riveting and Tinner's.....33½¢@55¢

Sargent's C. S. New List.....45¢@45¢@10

Heavy Hammers and Sledges—

\$1b. and under.....lb. 50¢

\$1 to 5 lb.....lb. 30¢ 70¢@100¢@75

Over 5 lb.....lb. 50¢

Note—Lower prices sometimes made by jobbers.

Wilkinson's Smiths'.....9½¢@10¢ lb.

Handcuffs and Leg Irons

See Police Goods.

Handles—**Agricultural Tool Handles—**

Box, Rake, Fork, etc.....50¢@100¢@80¢

Shovel, etc., Wood D Handle.....50¢@50¢@55

Cross-Cut Saw Handles—

Atkins.....40¢@55¢

Champion.....45¢@45¢@100

Diston's.....50¢

Mechanics' Tool Handles—

Auger, assorted.....gro. \$1.50@2.00

Auger, large.....gro. \$1.55@2.00

Bradawl.....gro. \$1.50@1.75

Chisel Handles:

Apple Tanged Firmer, gro. ass'd.....\$1.25@2.25; large, \$2.75@3.00.

Hickory Tanged Firmer, gro. ass'd.....\$1.75@2.25; large, \$2.55@2.50.

Apple Socket Firmer, gro. ass'd.....\$1.75@2.25; large, \$2.55@2.50.

Hickory Socket Firmer, gro. ass'd.....\$1.60@1.75; large, \$1.75@2.00.

Hickory Socket Framing, gro. ass'd.....\$1.50@2.25; large, \$2.55@2.50.

File, assorted.....gro. \$1.00@1.15

Hammer, Hatchet, etc., etc.....60¢@100¢

Hand Saw, Varinshed, doz. 75¢@80¢

Not Varinshed.....55¢@80¢

Plane Handles:

Jack, doz. 25¢@35¢; Jack Bolted.....55¢@60¢

Fore, doz. 35¢@38¢; Fore, Bolted.....70¢@75¢

Hangers—

Barn Door, New Pattern, Round Groove, Regular:

Each.....3 4 5 6 8 10 12 14 16 18 20 22 24 26 28 30 32 34 36 38 40 42 44 46 48 50 52 54 56 58 60 62 64 66 68 70 72 74 76 78 80 82 84 86 88 90 92 94 96 98 100

Doz.....\$1.10 1.15 1.20 1.25 1.30 1.35 1.40 1.45 1.50 1.55 1.60 1.65 1.70 1.75 1.80 1.85 1.90 1.95 2.00 2.05 2.10 2.15 2.20 2.25 2.30 2.35 2.40 2.45 2.50 2.55 2.60 2.65 2.70 2.75 2.80 2.85 2.90 2.95 3.00 3.05 3.10 3.15 3.20 3.25 3.30 3.35 3.40 3.45 3.50 3.55 3.60 3.65 3.70 3.75 3.80 3.85 3.90 3.95 4.00 4.05 4.10 4.15 4.20 4.25 4.30 4.35 4.40 4.45 4.50 4.55 4.60 4.65 4.70 4.75 4.80 4.85 4.90 4.95 5.00 5.05 5.10 5.15 5.20 5.25 5.30 5.35 5.40 5.45 5.50 5.55 5.60 5.65 5.70 5.75 5.80 5.85 5.90 5.95 6.00 6.05 6.10 6.15 6.20 6.25 6.30 6.35 6.40 6.45 6.50 6.55 6.60 6.65 6.70 6.75 6.80 6.85 6.90 6.95 7.00 7.05 7.10 7.15 7.20 7.25 7.30 7.35 7.40 7.45 7.50 7.55 7.60 7.65 7.70 7.75 7.80 7.85 7.90 7.95 8.00 8.05 8.10 8.15 8.20 8.25 8.30 8.35 8.40 8.45 8.50 8.55 8.60 8.65 8.70 8.75 8.80 8.85 8.90 8.95 9.00 9.05 9.10 9.15 9.20 9.25 9.30 9.35 9.40 9.45 9.50 9.55 9.60 9.65 9.70 9.75 9.80 9.85 9.90 9.95 10.00

Doz.....\$1.50 1.55 1.60 1.65 1.70 1.75 1.80 1.85 1.90 1.95 2.00 2.05 2.10 2.15 2.20 2.25 2.30 2.35 2.40 2.45 2.50 2.55 2.60 2.65 2.70 2.75 2.80 2.85 2.90 2.95 3.00 3.05 3.10 3.15 3.20 3.25 3.30 3.35 3.40 3.45 3.50 3.55 3.60 3.65 3.70 3.75 3.80 3.85 3.90 3.95 4.00 4.05 4.10 4.15 4.20 4.25 4.30 4.35 4.40 4.45 4.50 4.55 4.60 4.65 4.70 4.75 4.80 4.85 4.90 4.95 5.00 5.05 5.10 5.15 5.20 5.25 5.30 5.35 5.40 5.45 5.50 5.55 5.60 5.65 5.70 5.75 5.80 5.85 5.90 5.95 6.00 6.05 6.10 6.15 6.20 6.25 6.30 6.35 6.40 6.45 6.50 6.55 6.60 6.65 6.70 6.75 6.80 6.85 6.90 6.95 7.00 7.05 7.10 7.15 7.20 7.25 7.30 7.35 7.40 7.45 7.50 7.55 7.60 7.65 7.70 7.75 7.80 7.85 7.90 7.95 8.00 8.05 8.10 8.15 8.20 8.25 8.30 8.35 8.40 8.45 8.50 8.55 8.60 8.65 8.70 8.75 8.80 8.85 8.90 8.95 9.00 9.05 9.10 9.15 9.20 9.25 9.30 9.35 9.40 9.45 9.50 9.55 9.60 9.65 9.70 9.75 9.80 9.85 9.90 9.95 10.00

Chicago Spring Butt Co.:

Friction.....25¢

Oscillating.....25¢

Big Twin.....25¢

Chisholm & Moore Mfg. Co.:

Chicago.....55¢

Cleveland.....60¢

Baggage Car Door.....50¢

Elevator.....40¢

Railroad.....55¢

Clear Ball Bearing, ½ doz. pair \$3.50

No. 10 Roller Bearing, doz. pr. 5.50

No. 20 Roller Bearing, doz. pr. 4.50

Nickel.....50¢

J. G. C.....50¢@22¢@100

Lane Bros.:

Parlor, Standard.....40¢@52¢@24¢

Parlor, New Model.....40¢@24¢

Barn Door, Standard.....60¢@24¢

Covered.....50¢@10¢@100

Special.....60¢@5¢

Lawrence Bros.:

Crown.....60¢

New York.....60¢

Sterling.....60¢

McKinney Co.:

No. 2, Standard, \$18.....60¢@100

No. 1, Special, \$13.....60¢@100

Stowell Mfg. and Foundry Co.:

Badger.....60¢

Baggage Car Door.....50¢

Elmox Anti-Friction.....50¢

Elevator.....40¢

Interstate.....50¢@100

Magie.....50¢

Matchless.....50¢@100

Nausen.....50¢@100

Parlor Door.....50¢

Railroad.....50¢@100

Street Car Door.....50¢@100

Steel, Nos. 300, 400, 500.....50¢@100

Wild West.....50¢@5¢

Zenith for Wood Track.....50¢@100

Taylor & Boggs Foundry Co.:

Kidder's.....50¢@50¢@100

Van Wagoner & Williams Hdw. Co.:

American Trackless.....33½¢@100

Wilcox Mfg. Co.:

Bike Roller Bearing.....60¢@100

C. J. Roller Bearing.....60¢@100

Cycle Ball Bearing.....50¢

L. T. Roller Bearing.....50¢@100

New Era.....40¢@100

O. K. Roller Bearing.....60¢@100

Prindle Improved.....60¢@100

Richards' Improved.....60¢@100

Richards' Single Track.....50¢@100

Wilcox Dwarf Roller Bearing.....60¢@100

Wilcox Ives.....60¢@100

Wilcox Tandem Roller Bearing.....60¢@100

Wilcox Trolley Ball Bearing.....40¢

Wilcox Trolley Roller Bearing.....50¢

Wilcox Trolley Roller Bearing.....40¢@100

Fire.....40¢@100

Fire.....40¢@100

Fire.....40¢@100

Fire.....40¢@100

Fire.....40¢@100

Fire.....40¢@100

Fire.....40¢@100

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Fire.....40¢@100

Fire.....40¢@100

Fire.....40¢@100

Fire.....40¢@100

Fire.....40¢@100

Non-Holdback, Cast Iron—

gro. \$6.00@6.50

J. Bardsley

Bardsley's Patent Checking.....10¢

Bommer Bros.:

Bommer's.....40¢

Chicago Spring Butt Co.:

Chicago.....20¢

Garden City Engine House.....20¢

Keene's Saloon Door.....20¢

Triple End.....40¢

Coleman Hdw. Co.:

Champion Holdback.....\$ gr. \$10.00

J. G. C.....\$ gr. \$9.50

Nickel.....\$ gr. \$9.00

Lawson Mfg. Co.:

Matchless.....35¢

Matchless Pivot.....40¢

Payson Mfg. Co.:

Oblique, Dbl. Acting.....50¢@50¢@5¢

Stover Mfg. Co.:

Ideal, No. 18, Detachable, \$ gr.....\$12.50

Ideal, No. 4.....\$ gr. \$9.00

New Idea No. 1.....\$ gr. \$9.00

New Idea, Double Acting.....45¢

Van Wagoner & Williams Hdw. Co.:

American.....30¢@5¢

Columbia, No. 14.....\$ gr. \$3.00

Columbia, No. 18.....\$ gr. \$24.00

Crown.....30¢

Gem.....30¢

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Lemon Squeezers—

See Squeezers, Lemon.

Lifters, Transom—

Dickson:
3 x 4 ft. x 1/2".....\$100 \$11.00
Other sizes, Iron.....70&10%
Other sizes, Brass and Bronze.....70%
Excelsior.....60&60&10%
Payson's:
Solid Grip Nos. 643 and 644, \$100.....\$11.00
Bronzed Iron.....70%

Lines—

Wire Clothes, Nos. 18 19 20
100 feet.....\$3.50 \$ 75 \$ 25
75 feet.....\$1.75
Ossawa Mills:
Crown Solid Braided Chalk.....\$3.45
Mason's, No. 0 to No. 5.....33&4%
Silver Lake Braided Chalk, No. 0, \$6.00;
No. 1, \$6.50; No. 2, \$7.00; No. 3, \$7.50
\$ gr.....30%

Locks, &c.— Cabinet—

Cabinet Locks.....33&4% \$3.45 \$7.45

Door Locks, Latches, &c.—

[Net prices are very often made on these goods.]

Reading Hardware Co.....40%
R. & E. Mfg. Co.....40%
Sargent & Co.....40%
Slaymaker-Barry Co.....30&35%
Snow's Victor.....50&10%

Elevator—

Stowell's.....33&4%

Padlocks—

Wrought Iron, list Dec. 5, '97.....70&70&10%

Dog Collar, S. B. Co.....40%
R. & E. Mfg. Co. Wrt. Steel and Brass.....50%
S. B. & Co.....40%**Sash, &c.—**

Fitch's Bronze and Brass.....66&4%
Fitch's Iron.....70%
Ives' Patent.....62&10&96&10%
Payson's Perfect.....70%
Payson's Signal (new list).....75%
Reading.....60&10&10&70%

Machines—**Boring—**

Without Augers.
Upright. Angular.
Improved No. 3.....\$4.25 No. 1 \$5.00
Improved No. 4.....3.75 No. 2 3.38
Improved No. 5.....2.75
Jennings.....2.50 3.00
Miller's Falls.....4.75
Snell's, Rice's Pat. 2.50 2.75
Swan's, No. 500.....5.10 No. 200 6.45

Holisting—

Moore's Anti-Friction Differential Pulley Block.....30%
Moore's Hand Hoist, with Lock Brake.....30%

Washing—

Wayne American.....\$ doz. \$27.00
Western Star, No. 2, \$ doz. 28.00
Western Star, No. 3, \$ doz. 30.00
St. Louis, No. 41, \$ doz. 60.00

Mallets—

Hickory.....45&50&60&5%
Lignumvite.....45&50&50&5%
Timbers', Hickory and Applewood, doz.....60&50%
Fiber Head Stearns'.....30&10%

Mats—**Door—**

Elastic Steel (W. G. Co.).....10%

Mattocks—

List Feb. 25, 1899.....65&65&10%

Meat Cutters—

See Cutters, Meat.

Milk Cans—See Cans, Milk.**Mills— Coffee—**

Box and Side, list Jan. 1, '98.....60&50&60&10&5%

Net prices are often made on some goods which are lower than above discounts.

Enterprise Mfg. Co., list Jan. 17, '98.....30%
National, list Jan. 1, '98.....30%
Parker's Columbia and Victor.....60&10%
Parker's Upright.....30&10&40%
Swift, Lane Bros.....30%**Mining Knives—**

See Knives, Mining.

Molasses Gates—

See Gates, Molasses.

Money Drawers—

See Drawers, Money.

Mowers, Lawn—

Net prices are generally quoted.

10 12 14 16-inch

Onion.....\$1.75 \$2.00
Good.....3.00 3.25 3.50 3.75
High Grade 4.00 4.25 4.50 4.75
Pennsylvania and Continental 60&10&5%
Quaker City.....70&5%
Great American.....70&5%**Philadelphia:**

Styles M. S., C., K., T.....70&10%
Style A, all Steel.....60&10%
Style E, Low Wheel.....60&10%
Style K, High Wheel.....70&10%
Drexel and Gold Coin, low list.....50%

Nails—

Cut and Wire. See Trade Report.

Wire Nails and Brads, Paged.

List July 20, 1899.....80&80&10%

Hungarian, Finishing, Upholsterers', etc. See Tacks.

Horse—

Nos. 6 7 8 9 10

A. C.....25¢ 23¢ 22¢ 21¢ 21¢

Capwell.....19¢ 18¢ 17¢ 16¢ 16¢

C. B. K.....25¢ 23¢ 22¢ 21¢ 21¢

Chaplain.....28¢ 26¢ 25¢ 24¢ 23¢

Maud S.....25¢ 23¢ 22¢ 21¢ 21¢

Neponset.....23¢ 21¢ 20¢ 19¢ 18¢

Putnam.....23¢ 21¢ 20¢ 19¢ 18¢

Standard.....23¢ 21¢ 20¢ 19¢ 18¢

Star.....23¢ 21¢ 20¢ 19¢ 18¢

Vulcan.....23¢ 21¢ 20¢ 19¢ 18¢

25¢ 10%

Picture—

1 1/2 2 3 3 1/2 in.

Brass Head.....45¢ 60¢ 70¢ 95¢ 1.00 gro.

Por. Head.....1.10 1.10 1.10 .. gro.

Nippers, See Pliers and Nippers.**Nut Crackers—**

See Crackers, Nut.

Nuts—

List Feb. 1, '99.

Cold Punched. Off

Mfrs. or U. S. Standard. list

Hexagon, plain.....3.90 \$4.10

Square, plain.....3.90 \$4.10

Square, C. T. & R.....3.70 \$3.90

Hexagon, C. T. & R.....3.90 \$4.10

Hot Pressed:

Mfrs., U. S. or Nar. Gauge Stan'd.

Square.....4.50 \$4.60

Hexagon.....4.50 \$4.60

NOTE.—Tapped Nuts are now 2-10s.

higher than above.

Oakum—

Best or Government.....lb. 54¢

Navy.....lb. 44¢

U. S. Navy.....lb. 64¢

Plumbers' Spun Navy.....lb. 44¢

In carload lots 3/4 lb. off f.o.b. New York.

Oil Tanks—See Tanks, Oil.**Oilers—**

Brass and Copper.....10&10&50%

Tin or Steel.....60&10&10&70&5%

Zinc.....60&50&65%

Malleable, Hammers' Improved, No. 1, \$3.60; No. 2 \$4; No. 3, \$4.40 \$ doz. 30%

Malleable, Hammers' Old Pattern, same list.....50&10%

Willmot & Hobbs Mfg. Co.....70&70&10%

Openers, Can—

French.....doz 35¢

Iron Handle.....doz 25¢

Sprague, Iron Handle, per doz 35¢

Sardine Scissors.....doz. \$1.75 \$5.00

National, \$ gr.....\$1.75 \$2.00

Stowell's.....per doz. 40¢ 45¢

Packing—**Rubber—**

Standard, fair quality.....70&10&75%

Inferior quality.....75&10&80%

Extra.....60&50&60&10&5%

Jenkins' Standard, \$ b 80¢.....25¢ 25&5%

Miscellaneous—

American Packing.....9&10¢ lb.

Cotton Packing.....15¢ 14¢ lb.

Italian Packing.....10 1/4¢ 11 1/4¢ lb.

Jute.....5¢ 5 1/4¢ lb.

Russia Packing.....12¢ 13¢ lb.

Pails—**Creamery—**

E. S. & Co., with gauges, No. 1 \$6.50; No. 2, \$6.75 \$ doz.

Galvanized—

Inch.....10 12 14

Water, Standard, gro.....\$23.00 \$26.00 \$29.00

Water, Regular.....19.00 22.00 25.00

Water, Heavy.....22.00 25.00 28.00

Fire, Rd. Bottom, gro.....31.00 35.00 38.00

Well, gro.....31.00 35.00 38.00

Pans—**Dripping—**

Large Sizes.....lb. 1 1/4¢

Small Sizes.....lb. 5/4¢

Fry—

Standard List.....75¢ 10¢ 80%

Roasting and Baking—

Regal, S. S. & Co., \$ doz. Nos. 5, \$4.50; 10, \$5.00; 20, \$5.50; 30, \$6.00
Simplex, \$ gro., No. 40, \$30.00; 50, \$34.50; 60, \$39.00; 140, \$33.00; 150, \$37.50; 160, \$43.00.

Paper—**Building Paper—**

Per roll

Rosin Sized Sheathing: 500 sq. ft.

Light wt., 20 sq. ft. to lb. \$0.40 \$0.45

Medium wt., 12 sq. ft. to lb. \$0.60 \$0.65

Heavy wt., extra quality, \$0.95 \$1.05

Medium Grades Water Proof Sheathing.....\$0.80 \$1.25

Deafening Felt, 9, 6 and 1 1/2 sq. ft. to lb., ton.....\$4.50 \$5.00

York Haven Waterproof Sheathing.....\$1.35 \$1.75

Tarred Paper.

1 ply (roll 500 sq. ft.), ton.....\$35.00 \$40.00

2 ply, roll 100 sq. ft.....90¢

3 ply, roll 100 sq. ft.....\$1.20

Sand and Emery—

List Dec. 23, 1899.....50¢ 10¢ 50¢ 10¢ 10%

See Trade Report.

Parers—**Apple—**

Advance.....\$ doz. \$4.50

Baldwin.....\$ doz. \$5.00

Bonanza.....each \$5.00

Dandy.....each \$7.50

Eureka, 18".....each \$18.00

Family Bay State.....\$ doz. \$12.00

Hudson's I. I. Star.....\$ doz. \$4.00

Hudson's Ro-king Table.....\$ doz. \$5.50

Improved Bay State \$ doz. \$27.00 \$30.00

New Lightning.....\$ doz. \$5.50

Reading 72.....\$ doz. \$4.00

Reading 78.....\$ doz. \$7.00

Turn Table '98.....\$ doz. \$5.50

White Mountain.....\$ doz. \$4.00

Potato—

Sarotoga.....\$ doz. \$5.50

White Mountain.....\$ doz. \$4.50

Paris Green—

Arsenic, kegs or casks.....lb. 15 c

Kegs, 100 to 175 lb.....lb. 13 1/2 c

Kils, lb. 25, 50 lb.....lb. 14 1/2 c

Paper boxes, 2 to 5 lb.....lb. 14 1/2 c

Paper boxes, 1 lb.....lb. 15 c

Paper boxes, 1/2 lb.....lb. 16 c

Paper boxes, 3/4 lb.....lb. 17 c

Picks and Mattocks—

List Feb. 25, 1899.....65¢ 65¢ 10%

Pinking Irons—

See Irons, Pinking.

Pins—**Escutcheon—**

Brass.....60¢ 60¢ 5%

Iron, list Nov. 11, '88.....60¢ 60¢ 5%

Pipe, Cast Iron Soil—

Factory Shipments.

Standard, 2-6 in.....50¢ 50¢ 10%

Extra Heavy, 2-6 in.....50¢ 10¢ 60%

Fittings.....60¢ 60¢ 10%

Pipe, Wrought Iron—

Factory Shipments.

List February, 1899.

Plain and Galvanized:

Carload lots.....50¢ 10¢ 10%

Less than carload lots.....50¢ 10¢ 2 1/2%

Screw and Socket Casing.....57 1/2¢ 55%

Inserted Joint Casing.....32 1/2¢ 55%

Cold Drawn Seamless Steel Tubing.....60%

Planes and Plane Irons—

Wood Planes—

Molding.....40¢ 2 1/2% 40¢ 5%

Bench, First quality.....45¢ 10¢ 45¢ 10¢ 5%

Bench, Second quality.....50¢ 10¢ 50¢ 10¢ 5%

Bailey's (Stanley R. & L. Co.) 50&10&50&10&10%

Gage Self Setting.....35%

Iron Planes—

Bailey's (Stanley R. & L. Co.) 50&10&50&10&10%

Chaplin's Iron Planes.....50&10%

Miscellaneous Planes (Stanley R. & L. Co.).....25&10&25&10&10%

Sargent's.....50&10&60%

Plane Irons—

Wood Bench Plane Irons.....35¢ 35¢ 5%

Buck Bros.....30%

Butcher's.....\$5.00 \$5.25 to 2

Stanley R. & L. Co. 50&10&50&10&10%

L. & J. White.....20&5&25%

Plates—

Felloe.....lb. 3 1/2% 3 1/2%

Self-Setting Pie Plates (S. S. & Co.), \$ doz. \$2.00.....50%

Pliers and Nippers—

Button Pliers.....65¢ 10¢ 70¢ 5%

Gas Burner, per doz., 5 in., \$1.15 \$

\$1.20; 6 in., \$1.35 \$1.45

Gas Pipe.....7 8 10 12-in.

\$1.75 \$2.00 \$2.75 \$3.75

Aeme Nippers.....40¢ 40¢ 5%

Bernard's

Parallel Pliers, &c.....33&4%

Paragon Pliers.....50%

Lodi Pliers.....50%

Kim City Pease Pliers.....33&4%

Heller's Farriers' Pincers and Tools.

40¢ 40¢ 5%

Morrill's Parallel, \$ doz. \$12.00.....30&5%

P. S. & W. Cast Steel.....30&10&40%

P. S. & W. Timmers' Cutting Nippers, 40¢ 40¢ 5%

Utica Drop Forge & Tool Co.

Pliers and Nippers, all kinds.....40%

Plumbs and Levels—

Plumbs and Levels.....70¢ 10¢ 10¢ 75¢ 10¢ 10%

Disston's.....70%

Pocket Levels.....70&10&10¢ 75&10%

Stanley R. & L. Co. 70&10&10¢ 70&10&10%

Stanley

Shovels and Tonges—

Brass Head 60¢@50¢@10¢
 Iron Head 60¢@50¢@10¢

Sieves and Sifters—

Hunter's Imitation, gro. \$11.00@12.00
 Buffalo Metallic Blue, S. & Co., gr. 1
 14¢ 15 16¢ 18¢ 20¢
 \$12.90 \$13.80 \$15.00
 Eclipse gr. \$10.00
 Electric Light gr. \$12.00
 Hunter's Genuine gr. \$12.50
 Shaker (Barber's Pat.) Flour Sifters.
 7 doz., \$2.00 35¢

Sieves, Wooden Rim—

Nest'd, 10, 11 and 12 Inch.
 Mesh 18, Nested, doz. \$0.75@0.80
 Mesh 20, Nested, doz. 85¢ .90
 Mesh 24, Nested, doz. 1.00@1.05

Sinks—**Cast Iron—**

Low list 80¢@65¢
 * NOTE.—The low list is now generally
 used, but some jobbers use high list.

Wrought Steel—

Columbus Galv'd and Enamelled, 60¢@5¢
 Columbia's, Painted 45¢
 L. & O. 50¢

Skins, Wagon—

Cast Iron 70¢@70¢@10¢
 Malleable Iron 40¢@10¢@50¢
 Steel 35¢@35¢@5¢
 L. I. & B. Co. Steel 35¢

Slates—

"D" Slates 50¢@10¢@50¢@10¢
 Unexcelled Noiseless Slates,
 60¢@6 tens@60¢@6 tens@5¢
 Wire Bound 40¢@10¢@50¢
 Double Slates, add \$1 case, net.

Slaw Cutters—See Cutters.**Snaps, Harness—**

German 40¢@40¢@10¢
 Covert Mfg. Co.:
 Tier 1 45¢
 High Grade 45¢@25¢
 Jockey 45¢@25¢
 Trojan 45¢@25¢

Covert's Saddlery Works:
 Banner 60¢@10¢
 Cross 60¢@10¢
 Triumph 60¢@10¢

W. & E. T. Fitch Co.:
 Bristol 40¢@10¢
 Empire 50¢@5¢
 German 40¢
 National 50¢@25¢
 Perfect 60¢@5¢
 Clipper 40¢
 Champion 40¢
 Security 40¢
 Victor 60¢@5¢
 O. E. S. Company 65¢@65¢@10¢
 Solid Steel 65¢@10¢@10¢
 Solid Swivel 65¢@10¢@10¢
 Sargent's Patent Guarded 60¢@60¢@10¢

Snaths—

Scythe 45¢@5¢

Snips, Tinnners'—See Shears.**Soldering Irons—**

See Irons, Soldering.

Spoke Trimmers—

See Trimmers, Spoke.

Spoons and Forks—**Silver Plated—**

Flat Ware 50¢@10¢@60¢@10¢
 Wm. Rogers Mfg. Co. 50¢@10¢

Miscellaneous—

German Silver 60¢@10¢
 Wm. Rogers Mfg. Co.:
 185 German Silver 60¢
 Rogers' Silver Metal 50¢@10¢

Springs—**Door—**

Gem (Coll) 20¢
 Star (Coll) 30¢
 Torrey's Rod, 99 in. \$ doz. \$1.10@1.55
 Warner's No. 1, \$ doz. \$1.50@1.10
 \$3.40 50¢@55¢@10¢
 Victor (Coll) 60¢@10¢@60¢@10¢@5¢

Carriage, Wagon, &c.

34 in. and wider...Blk. Hf. Brt. Brt.
 Tested and Temp 54 54 6c lb
 Oil Tested and
 Tempered 64 64 7c lb
 Cliff's Bolster Springs 35¢
 Cliff's Seat Springs pair 55¢

Sprinklers, Lawn—

Enterprise 35¢@30¢
 Philadelphia No. 1, \$ doz. \$12; No. 2,
 \$15; No. 3, \$24

Squares—

Nickel plated... List Jan. 5, 1900
 Steel and Iron, 70¢@70¢@5¢
 Rosewood Hdl. Try Square and T-
 Bevels 60¢@10¢@10¢@70¢
 Iron Hdl. Try Squares and T-Bevels,
 40¢@10¢@10¢@10¢

Mason's Try Sq. and T-Bevels 60¢@10¢
 Waterbottom's Try and Miter 50¢@10¢

Squeezers—**Lemon—**

Wood, Common, gro. No. 0, \$5.00;
 No. 1, \$5.75@5.00; No. 2, \$10.00.
 Wood, Porcelain Lined:
 Oneap doz. \$2.00@2.75
 Wood Trade doz. \$3.00@3.50

Tinned Iron doz. \$0.75@1.25
 Iron, Porcelain Lined doz. \$2.90@3.25
 Jennings' Star \$ doz. \$1.85@1.90
 King \$ doz. \$2.00

Staples—

Barbed Blind lb. 9¢@10¢
 Electricians', Association list, 75¢@10¢
 Fence Staples, same price as Barbed
 Wire. See Trade Report.
 Poultry Netting 80¢@10¢
 Grand Crossing Tack Co.'s list 75¢@10¢

Steels, Butchers'—

Dick's 40¢
 Foster Bros' 30¢
 C. & A. Hoffmann's 40¢
 Nichols Bros 50¢

Steelyards—

Blacksmiths' 40¢

Stocks and Dies—

Gardner 50¢
 Green River 25¢
 Lightning Screw Plate 25¢
 Little Giant 25¢
 Reese's New Screw Plates 25¢@30¢
 Curtis Reversible Ratchet Die Stock, 25¢

Stone—**Scythe Stones—**

Pike Mfg. Co., list '95-'96 33¢
 Cleveland Stone Co., list Nov. '92, 33¢

Oil Stones, &c.

Pike Mfg. Co.:
 Hindostan No. 1, \$ doz. 85¢
 Sand Stone 85¢
 Turkey Oil Stone, Extra 85¢@10¢
 5 to 3 in. 80¢
 Turkey Slips \$1.50
 Lily White Washita 60¢
 Rosy Red Washita 60¢
 Washita Stone, Extra 50¢
 Washita Stone, No. 1 40¢
 Washita Stone, No. 2 30¢
 Lily White Slips 90¢
 Rosy Red Slips 90¢
 Washita Slips, Extra 90¢
 Washita Slips, No. 1 70¢
 Arkansas Stone, No. 1, 5 to 8 in. \$3.50
 Arkansas Stone, No. 1, 5 to 8 in. \$3.50
 Tanite Mills:
 Emery Oil, \$ doz. \$5.00 50¢@60¢

Stoners—**Cherry—**

Enterprise 25¢@30¢

Stops, Bench—

Millers Falls 15¢@10¢
 Morrill's, \$ doz. No. 1, \$10.00; No. 2,
 \$11.00, 40¢@20¢

Stops, Window—

Ives' Patent 25¢@5¢
 Taplin's 45¢

Stove Boards—

See Boards, Stove.

Stove Polish—See Polish, Stove.**Straps, Box—**

Cary's Universal, case lots 20¢@10¢

Stretchers, Carpet—

Cast Iron, Steel Points doz. 55¢@5¢
 Cast Steel, Polished doz. 25¢
 Socket doz. \$1.75

Stuffers, Sausage—

Miles' Challenge, \$ doz. \$20 50¢@50¢@5¢
 Enterprise Mfg. Co. 25¢@25¢@7¢
 National Specialty Mfg. Co., list Jan.
 1, '97 30¢

Tacks, Brads, &c.—

List Jan. 15, '99.
 Carpet Tacks:
 American Blue 90¢@90¢@10¢
 American Tinned 90¢@90¢@10¢
 American Cut Tacks 90¢@90¢@10¢
 Suedes Iron Tacks 90¢@90¢@10¢
 Suedes Upholsterers' Tacks 90¢@90¢@25¢
 Gimp Tacks 90¢@90¢@25¢
 Lace Tacks 90¢@90¢@25¢
 Trimmers' Tacks 80¢@90¢@10¢
 Looking Glass Tacks 70¢@70¢@10¢
 Bill Posters' and Railroad Tack 90¢@90¢@25¢
 Hungarian Nails 30¢@30¢@15¢
 Common and Patent Brads 70¢@5¢
 Trunk and Clout Nails 75¢@75¢@10¢
 NOTE.—The above prices are for
 straight weights. An extra 5¢ is given
 Star Weights and an extra 10¢@5¢ on
 Standard Weights.

Miscellaneous—

Double Point Tacks 90¢@5¢@90¢@10¢
 Steel Wire Brads, R. & E. Mfg.
 Co.'s list 50¢@10¢@60¢
 See also Nails, Wire.

Tanks, Oil—

Emerald, S. S. & Co. 30-gal. \$3.90
 Emerald, S. S. & Co. 60-gal. \$4.00
 Queen City S. S. & Co., 30-gal. \$3.50
 Queen City S. S. & Co., 60-gal. \$4.35

Tapes, Measuring—

American Ases' Skin 40¢@10¢@50¢
 Patent Leather 25¢@30¢@5¢
 Steel 40¢@10¢@5¢
 Chesterman's 25¢@25¢@5¢

Eddy's Steel 40¢@40¢@5¢
 Eddy's Metallic 33¢@33¢@5¢
 Kenfield & Esser Co. Steel and Metallic.
 Lower list, 1899 35¢
 Lufkin's Steel 33¢@33¢
 Lufkin's Metallic 30¢@5¢

Thermometers—

Tin Case 80¢@80¢@10¢

Ties, Bale—Steel.

Standard Wire 50¢@10¢@5¢

Ties, Wall—

Cleveland, Steel \$ 1000, \$10.00

Tinnners' Shears, &c.—

See Shears, Tinnners', &c.

Tinware—

Stamped, Japanned and Piced, sold
 very generally at net prices.

**Tire Benders, Upsetters,
&c.—See Benders and Upset-
ters, Tire.****Tobacco Cutters—**

See Cutters, Tobacco

Tools—**Coopers'—**

L. & I. J. White 20¢@20¢@5¢

Saw—

Atkins' new list 40¢
 Simonds' Improved 33¢
 Simonds' Crescent 25¢

Ship—

L. & I. J. White 25¢

Transom Lifters—

See Lifters, Transom.

Traps—Game—

Oneida Pattern 70¢@10¢@75¢@5¢
 Newhouse 45¢@50¢
 Hawley & Norton 65¢@5¢@70¢
 Victor (Oneida Pattern) 75¢@70¢@10¢
 Star (Blake Pattern) 65¢@10¢@70¢@5¢

Mouse and Rat—

Mouse, Wood, Choker, doz. holes, 9¢@10¢
 Mouse, Round or Square Wire
 doz. \$0.85@1.00

Marty French Rat and Mouse Traps

(Genuine):
 No. 1, Rat, \$ doz. \$12.00; case of 24
 \$10.50
 No. 3, Rat, \$ doz. \$5.50; case of 50
 \$5.00
 No. 3, Rat, \$ doz. \$1.50; case of 72
 \$4.00
 No. 4, Mouse, \$ doz. \$3.50; case of 72
 \$2.75
 No. 5, Mouse, \$ doz. \$2.75; case of 150
 \$2.25

Schuyler's Rat Killer, No. 1, \$ gr. \$30.00;
 No. 2, \$ gr. \$30.00; Mouse, No. 3,
 \$18.00
 Out o' Sight, Mouse, No. 1, \$ doz. 60¢
 Rat, No. 2, \$1.25; Mole, \$6.00;
 Gopher, \$1.50; Stop Thief, No. 1,
 \$1.25; No. 2, \$1.50.

Mouse and Rat—**Mouse, Round or Square Wire—**

doz. \$1.15@1.25; gro. \$12.00@14.00
 Harper, Champion or Paragon
 doz. \$1.25@1.40; gro. \$13.50@15.00

Trimmers, Spoke—

Bonney's Nos. 1 and 2 40¢
 Stearns 25¢

Trowels—

Dixton Brick and Pointing 30¢
 Dixon's Patent 25¢
 Dixon's Standard Brand and Gar-
 den Trowels 40¢
 Never-Break Steel Garden Trowels
 gro. \$7.00
 Peace's Plastering 30¢
 Rose Brick and Plastering 25¢@5¢
 Woodrough & McParlin, Pl'string, 25¢@10¢

Trucks, Warehouse, &c.—

B. & L. Block Co.'s list 40¢
 Daisy Stove Trucks, Improved pattern
 \$ doz. \$18.00

Tubs, Wash—

No. 1 2 3
 Galvanized, per doz. \$5.00 5.50 6.00
 Galvanized S. S. & Co., with Wringer
 Attachment, \$ doz. No. 10, \$7.35
 No. 20, \$7.75; No. 30 \$8.25

Twine—**Blinder—**

Carload lots f.o.b. New York, Phila-
 delphia or Boston.
 White Sisal, 500 ft. to lb. per lb. 11¢
 Standard, 500 ft. to lb. per lb. 11¢
 Manila, 600 ft. to lb. per lb. 14¢
 Pure Manila, 650 ft. to lb. per lb. 15¢
 Less than carloads add 1¢ per lb.

Miscellaneous—

Flax Twine BC B.
 No. 9, 14 and 14-lb. Balls, 25¢ 25¢
 No. 12, 14 and 14-lb. Balls, 19¢ 25¢
 No. 18, 14 and 14-lb. Balls, 16¢ 19¢
 No. 24, 14 and 14-lb. Balls, 16¢ 19¢
 No. 36, 14 and 14-lb. Balls, 15¢ 15¢
 Chalk Line, Cotton, 14-lb. Balls
 18¢@20¢
 Cotton Mops, 6, 9, 12 and 15 lb. to
 doz 7¢@8¢
 Cotton Wrapping, 5 Balls to lb
 9¢@15¢
 American 3-Ply Hemp, 14 and 14-lb.
 Balls 12¢@15¢
 American 3-Ply Hemp, 1-lb. Balls
 12¢@15¢

India 2-Ply Hemp, 14 and 14-lb.
 Balls (Spring Twine) 10¢
 India 3-Ply Hemp, 1-lb. Balls 10¢
 India 3-Ply Hemp, 14-lb. Balls 9¢
 2, 3, 4 and 5-Ply Jute, 14-lb. Balls
 8¢@9¢

Mason Line, Linen, 14-lb. Balls 15¢
 No. 26 Mattress, 14 and 14-lb. Balls, 35¢
 Wool 7¢

Vises—

Solid Box 50¢@10¢

Bonney's Saw Vises 40¢@10¢

Parallel—

Atch Machine Co.:
 Simpson's Adjustable 40¢
 Standard 40¢
 Amateur 25¢
 Bonney's 40¢@10¢
 Fisher & Norris Double Screw 15¢@10¢
 Holland's 40¢@10¢
 Lewis Tool Co. 15¢@20¢
 Massey's Perfect 30¢@40¢
 Massey's Clincher 20¢
 Merrill's 20¢
 Miller's Falls low list 10¢

Parker's:
 Victor 20¢@25¢
 Regulars 20¢@25¢
 Vulcan's 40¢@45¢
 Combination Pipe 55¢@60¢
 Prentiss 20¢@25¢
 Sargent's 60¢@60¢@10¢
 Simpson's Adjustable 40¢
 Snelker's X. L. 20¢@25¢
 Stephens' 20¢@25¢
 Toles' Woodworking 25¢
 Trenton 40¢@50¢@10¢

Saw Filers—

Bonney's, No. 1, \$13; No. 3, \$16 50¢@10¢
 Dis-t-u's D 3 Clamp and Guide, \$ doz
 \$30 25¢
 Reading 40¢@10¢
 Wentworth's Rubber Jaw, Nos. 1, 2
 and 3 80¢@74¢

Miscellaneous—

Signal & Keeler Combination Pipe
 Vise 60¢

Parker's Combination Pipe:
 87 Series 60¢
 187 Series 60¢@5¢
 No. 870 40¢

Wads—Price Per M.

B. E., 11 up 60¢
 B. E., 9 and 10 70¢
 B. E., 8 80¢
 B. E., 7 80¢
 P. E., 11 up \$1.00
 P. E., 9 and 10 1.35
 P. E., 8 1.50
 P. E., 7 1.60
 Ely's B. E., 11 and larger, \$1.70@1.75
 Ely's P. E., 12 to 20 \$3.00@3.25

Wagon Jacks—

See Jacks, Wagon.

Ware, Hollow—

Aluminum—
 S. S. & Co. Reduced List 40¢

Cast Iron, Hollow—

Stove Hollow Ware:
 Ground 60¢@60¢@7¢
 Unground 65¢@65¢@10¢
 White Enamelled Ware:
 Moslin Kettles 75¢@10¢@75¢@10¢@5¢
 Boilers and Saucepans 55¢@55¢@5¢
 Tinned Boilers and Saucepans
 55¢@55¢@5¢

See also Pots, Glue.

Enamelled—

Agate Nick 1 Steel Ware, list July '99, 40¢
 Granite Ware, list Jan. 1, '94, revised
 Jan. 2, '95 40¢@10¢
 Second Quality, Agate Nickel Steel, 65¢
 70¢@10¢@70¢@10¢@10¢

Iron Clad:

Peppered Ware, high list 70¢
 P. Incess Ware, special list 38¢
 Mottled Ware, high list 75¢
 Never Break Enamelled 50¢@50¢@10¢

Tea Kettles—

Galvanized Tea Kettles:
 Inch 6 7 8 9
 Each 10¢ 15¢ 20¢ 25¢

Steel Hollow Ware.

Avery Spiders & Griddles 65¢@65¢@5¢
 Avery Kettles 60¢
 Porcelain 50¢@50¢@10¢
 Never Break Spiders and Griddles
 65¢@65¢@5¢
 Never Break Kettles 60¢@60¢@10¢
 Solid Steel Spiders & Griddles, 70¢@70¢@5¢
 Solid Steel Kettles 60¢
 Solid Steel Ware, Enamelled 50¢@5¢

Washers—
Leather, Axle—
 Solid.....80¢10¢10¢85¢
 Patent.....85¢85¢85¢
 Coil: 7/8 1 1 1/2 1 3/4 Inch.
 12c 13c 14c 16c per 100
Iron or Steel—
 Size bolt....5-16 3/4 1/2 5/8 3/4
 Washers.....\$6.20 5.30 4.00 3.80 3.60
 In lots less than one keg add 1/4c per
 lb., 5-lb. boxes add 1/2c to list.
 NOTE.—Jobbers' prices generally lower
 than manufacturers'.

Washer Cutters—
 See Cutters, Washer.
Washing Machines—
 See Machines, Washing.
Water Coolers—
 See Coolers, Water.
Weaners—
 Tyler's New Heater—No. 1 # doz. \$3.45;
 No. 2, \$3.70; No. 3, \$4.00; No. 4, \$4.30
 Tyler's Safety—Nos. 1 and 2, # doz. \$1.70;
 No. 3, \$2.00; No. 4, \$2.30.
Wedges—
 Oil Finish.....lb. 1/4 @ 1/4c
 Aze Finish.....lb. 1/4 @ 1/4c

Weights, Sash—
 Carloads at factory.....\$21.00@...
 Less than carloads at factory.....
 \$22.00@...
 NOTE.—There is a wide difference in
 prices East and West, and some found-
 ries are naming considerably higher
 prices than the above.

Well Buckets, Galvanized
 See Pails, Galvanized.

Wheels Well—
 8-in., \$1.75@2.00; 10-in., \$2.25@2.80;
 12-in., \$2.75@3.25; 14-in., \$3.00@4.50

Wire and Wire Goods—
 Brl. and Ann., 6 to 9.65¢7 1/4¢65¢10¢
 Brl. and Ann., 10 to 18.....70¢70¢5¢
 Brl. and Ann., 19 to 26.....72 1/2¢5¢72 1/2¢10¢
 Brl. and Ann., 27 to 36.....75¢75¢5¢
 Cop'd and Galv., 6 to 9.65¢7 1/4¢65¢10¢
 Cop'd and Galv., 10 to 18.....65¢65¢10¢
 Tinned, 6 to 14.....70¢70¢5¢
 Tinned, 15 to 18.....67 1/2¢67 1/2¢5¢
 Annealed Wire on Spools.....
 60¢10¢60¢10¢5¢
 Brass, list Feb. 26, '96.....15¢
 Copper, list Feb. 26, '96.....15¢
 Cast Steel Wire.....50¢

Stubs' Steel Wire.....\$6.00 to 2, 40¢
 Wire Clothes Line, see Lines.
 Wire Picture Cord, see Cord.

Bright Wire Goods—
 Iron and Brass, list July 1, 1899....
 80¢10¢30¢10¢10¢

Wire Cloth and Netting—
 Galvanized Wire Netting.....
 75¢10¢5¢30¢

Painted Screen Cloth per 100 ft.....
 \$1.40@...

Hardware Grade, 2 to 18 mesh.....
 sq. ft. 2 1/4¢3c

Hardware Grade, 20 x 20 mesh.....
 sq. ft. 3¢3 1/2c

Galv. Hardware Grade, 2 to 5 mesh.....
 sq. ft. 3 1/4¢3 1/2c

Galv. Hardware Grade, 6 to 8 mesh.....
 sq. ft. 3 1/2¢4 1/4c

Wire Barb—See Trade Reporter
Wire, Rop 3—See Rope, Wire.

Wrenches—
 Agricultural.....75¢...
 Baxter's S.....60¢10¢
 Coes' Genuine.....33 1/4¢10¢5¢5¢3¢
 Coes' "Mechanics".....33 1/4¢10¢5¢5¢3¢
 Acme.....50¢10¢
 Aiken's Pocket (Bright).....82¢10¢
 Alligator.....80¢10¢10¢

Bemis & Call's:
 Adjustable S.....35¢5¢
 Adjustable 9 Pipe.....40¢
 Briggs' Pattern.....30¢10¢
 Combination Black.....40¢10¢
 Combination Bright.....40¢5¢
 Cylinder or Gas Pipe.....55¢
 Extra Heavy.....55¢
 Merrick's Pattern.....50¢
 No. 3 Pipe, Bright.....55¢
 Rindley Automatic.....30¢
 Boardman's.....33 1/4¢
 Bull Doz. W. & B.....108¢10¢10¢
 Donohue's Engineer.....40¢10¢
 Earle.....50¢10¢
 Hercules.....70¢
 Solid Handles, P. S. & W.....50¢
 Stevenson.....60¢10¢10¢
 Stillson's.....55¢

Wrought Goods—
 Staples, Hooks, &c., list March 17,
 '92.....30¢20¢35¢

Yokes, Neck—
 Covert Saddlery Works, Trimmer 1, 60¢5¢
 Covert Saddlery Works, Neck Yoke
 Centers.....70¢

Yokes, Ox, and Ox Bows—
 Fort Madison's Farmers & Freighters...
 list not

Zinc—
 Sheet.....lb. 7 1/4¢8¢

PAINTS, OILS AND COLORS.—Wholesale Prices.

White Lead, Zinc, &c.

Lead, Foreign white, in Oil.....7 1/4¢ 9 1/4¢
 Lead, American White, in Oil:
 Lots of 500 lb or over.....@ 6 1/4¢
 Lots less than 500 lb.....@ 7¢
 Lead, White, in oil, 25 lb tin
 pails, add to keg price.....@ 3 1/4¢
 Lead, White, in oil, 12 1/2 lb tin
 pails, add to keg price.....@ 1¢
 Lead, White, in oil, 1 to 5 lb as-
 sorted tins, add to keg price.....@ 1 1/4¢
 Lead, American, Terms: On lots of 500
 lbs. and over, 60 days, or 25 for cash if
 paid in 15 days from date of invoice.
 Zinc, American, dry.....@ 4 1/4¢ 5 1/4¢
 Zinc, Paris, Green Seal.....@ 8 1/4¢
 Zinc, Paris, Green Seal.....@ 9 1/4¢
 Zinc, Antwerp Red Seal.....@ 7 1/4¢
 Zinc, Antwerp Green Seal.....@ 5 1/4¢
 Zinc, V. M. in Poppy Oil, G. Seal.....
 lots of 1 ton and over.....@ 11 1/4¢
 lots less than 1 ton.....@ 12 1/4¢
 Zinc, V. M. in Poppy Oil, Red Seal.....
 lots of 1 ton and over.....@ 10 1/4¢
 lots less than 1 ton.....@ 11 1/4¢
 Discounts.—V. M. French Zinc.—Dis-
 counts to buyers of 10 bbl. lots of one or
 assorted grades, 1%; 25 bbls., 2%; 50 bbls.,
 4%. No discount allowed on less than 10
 bbl. lots.

Dry Colors.

Black, Carbon.....@ 2 1/4¢ 4¢
 Black, Drop, Amer.....@ 2 1/4¢ 4¢
 Black, Drop, Eng.....@ 5¢ 10¢
 Black, Ivory.....@ 9¢ 20¢
 Lamp, Com.....@ 3¢ 5¢
 Blue, Celestial.....@ 5 1/4¢ 8¢
 Blue, Chinese.....@ 35¢ 40¢
 Blue, Prussian.....@ 30¢ 35¢
 Blue, Ultramarine.....@ 7¢ 35¢
 Brown, Spanish.....@ 1¢ 1 1/2¢
 Brown, Vandyke, Amer.....@ 14¢ 21¢
 Brown, Vandyke, Foreign.....@ 21¢ 31¢
 Carmine, No. 40.....@ \$2.15@2.75¢
 Green, Chrome, ordinary.....@ 5¢ 6¢
 Green, Chrome, pure.....@ 19¢ 25¢

Lead, Red, bbls. 1/2 bbls. and kegs:

Lots 500 lb or over.....@ 6 1/4¢
 Lots less than 500 lb.....@ 7¢
 Litharge, bbls. 1/2 bbls. and kegs:
 Lots 500 lb or over.....@ 6 1/4¢
 Lots less than 500 lb.....@ 7¢
 Ocher, French Washed.....@ 14¢ 2 1/4¢
 Ocher, Dutch Washed.....@ 4 1/4¢ 5¢
 Ocher, American.....@ 10¢ 10¢ 15¢ 20¢
 Orange Mineral, English.....@ 11 1/4¢ 11 1/4¢
 Orange Mineral, German.....@ 12¢ 12¢
 Orange Mineral, American.....@ 8 1/4¢ 8 1/4¢
 Red, Indian, English.....@ 4 1/4¢ 8 1/4¢
 Red, Indian, American.....@ 3¢ 3 1/4¢
 Red, Turkey, Enail h.....@ 5¢ 10¢
 Red, Tuscan, English.....@ 7¢ 10¢
 Red, Venetian, Amer.....@ 100¢ 100¢
 Red Venetian, English.....@ 14¢ 2¢
 Sienna, Italian, Burnt and
 Powdered.....@ 3 1/4¢ 6¢
 Sienna, Ital., Raw, Powd.....@ 3 1/4¢ 6¢
 Sienna, American, Raw.....@ 1 1/4¢ 2¢
 Powdered.....@ 1 1/4¢ 2¢
 Talc, French.....@ 100¢ \$1.25 @ 1.50¢
 Talc, American.....@ 90¢ 110¢
 Terra Alba, French.....@ 100¢ 100¢
 Terra Alba, English.....@ 85¢ 100¢
 Terra Alba, American No. 1.....@ 70¢
 Terra Alba, American No. 2.....@ 45¢ 50¢
 Umber, Turkey, Bnt. & Powd.....@ 2 1/4¢ 3 1/4¢
 Umber, Turkey, Raw & Powd.....@ 2 1/4¢ 3 1/4¢
 Umber, Bnt. Amer.....@ 1 1/4¢ 2¢
 Umber, Raw, Amer.....@ 1 1/4¢ 2¢
 Yellow, Chrome.....@ 10¢ 25¢
 Vermilion, American Lead.....@ 10¢ 25¢
 Vermilion, Quicksilver, bulk.....@ 70¢
 Vermilion, Quicksilver, bags.....@ 70¢
 Vermilion, English, Import.....@ 71¢ 73¢
 Vermilion Chinese.....@ 80¢ 90¢

Colors in Oil.

Black Lampblack.....@ 10¢ 14¢
 Blue, Chinese.....@ 35¢ 40¢
 Blue, Prussian.....@ 30¢ 35¢
 Blue, Ultramarine.....@ 12¢ 16¢

Brown, Vandyke.....@ 10¢ 13¢

Green, Chrome.....@ 8¢ 14¢
 Green, Paris.....@ 10¢ 13¢
 Sienna, Burnt.....@ 10¢ 13¢
 Sienna, Raw.....@ 9¢ 12¢
 Umber, Burnt.....@ 9¢ 12¢

Miscellaneous.

Barytes, Foreign, # ton.....@ 18.00@20.00¢
 Barytes, Amer. floated.....@ 19.00@20.00¢
 Barytes, Crude.....@ 9.00@10.00¢
 Chalk, in bulk.....@ 2.15¢ 2.25¢
 Chalk, in bbls.....@ 100¢ 85¢
 China Clay, English.....@ 11.00@17.00¢
 Cobalt, Oxide.....@ 100¢ 2.00¢ 2.10¢
 Whiting, Common.....@ 100¢ 42¢ 52¢
 Whiting, Gliders.....@ 54¢ 64¢
 Whiting, extra Gliders.....@ 58¢ 68¢

Putty.

In bulk.....@ 1.25¢
 In bladders.....@ 2.25¢
 In cans, 50 lb.....@ 2.25¢
 In cans, 25 lb.....@ 2.25¢
 In cans, 12 1/2 lb.....@ 2.25¢
 In cans, 5 lb.....@ 3.50¢
 In cans, 3 lb.....@ 4.00¢
 In cans, 2 lb.....@ 4.50¢
 In cans, 1 lb.....@ 5.00¢

Spirits Turpentine.

In Southern bbls.....@ 53 1/4¢
 In machine bbls.....@ 54 1/4¢

Glue.

Low Grade.....@ 13¢ 15¢
 Cabinet.....@ 13¢ 15¢
 Medium White.....@ 14¢ 16¢
 Extra White.....@ 16¢ 18¢
 French.....@ 12¢ 25¢
 Irish.....@ 13¢ 15¢

Animal, Fish and Vege- table Oils.

Linseed, City, raw.....@ gal. 53¢ 54¢
 Linseed, City, boiled.....@ 55¢ 56¢
 Linseed, State and West'n, raw 51¢ 53¢

Linseed, raw Calcutta seed.....@ 55¢

Lard, Prime.....@ 50¢ 52¢
 Lard, Extra No. 1.....@ 40¢ 41¢
 Lard, No. 1.....@ 37¢ 38¢
 Cotton-seed, Crude.....@ 33¢ 34¢
 Cotton-seed, Summer Yellow,
 prime.....@ 38¢ 40¢
 Cotton-seed, Summer Yellow,
 off grades.....@ 27¢ 29¢
 Sperm, Crude.....@ 2¢
 Sperm, Natural Spring.....@ 2¢
 Sperm, Bleached Spring.....@ 2¢
 Sperm, Natural Winter.....@ 55¢ 58¢
 Sperm, Bleached Winter.....@ 60¢ 63¢
 Whale, Crude.....@ 2¢
 Whale, Natural Winter.....@ 41¢ 48¢
 Whale, Bleached Winter.....@ 45¢ 48¢
 Whale, Extra Bleached Win.....@ 48¢ 49¢
 Menhaden, Crude, Sound.....@ 37¢
 Menhaden, Light Strained.....@ 29¢ 30¢
 Menhaden, Bleached Winter.....@ 32¢ 33¢
 Menhaden, Extra Bleached.....@ 35¢ 38¢

Mineral Oils.

Black, 20 gravity, 25@30 cold
 test.....@ gal. 11¢ 11 1/4¢
 Black, 20 gravity, 15 cold test, 12¢ 12 1/4¢
 Black, summer.....@ 10¢ 11¢
 Cylinder, light filtered.....@ 15¢ 17 1/4¢
 Cylinder, dark filtered.....@ 13¢ 16¢
 Paraffine, 903-907 gravity.....@ 14¢ 14 1/4¢
 Paraffine, 903 gravity.....@ 13¢ 13 1/4¢
 Paraffine, 883 gravity.....@ 11 1/4¢ 12¢
 Paraffine, red, No. 1.....@ 14¢ 14 1/4¢
 In small lots 1/4¢ advance.

THE IRON AGE.

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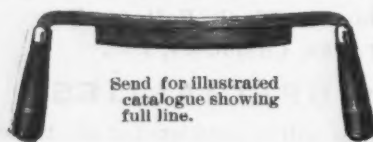
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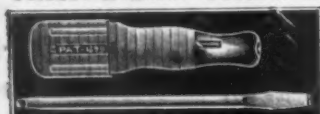
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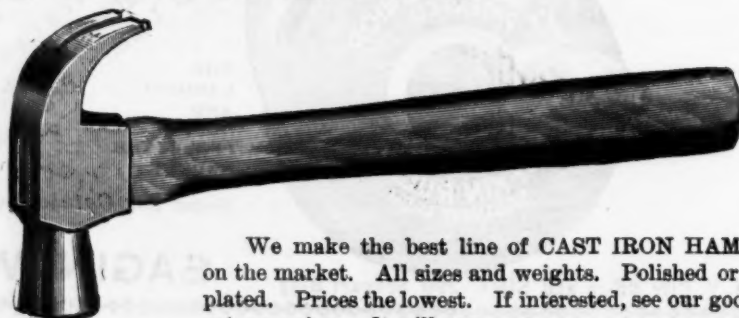


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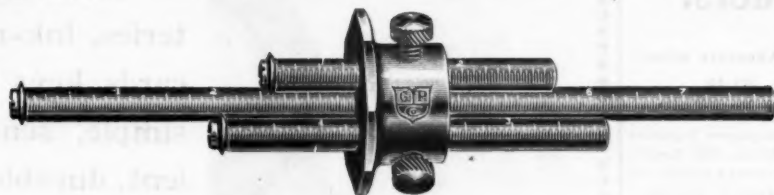
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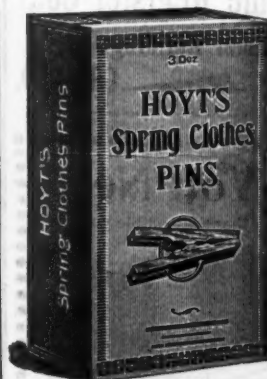
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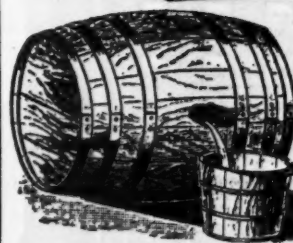
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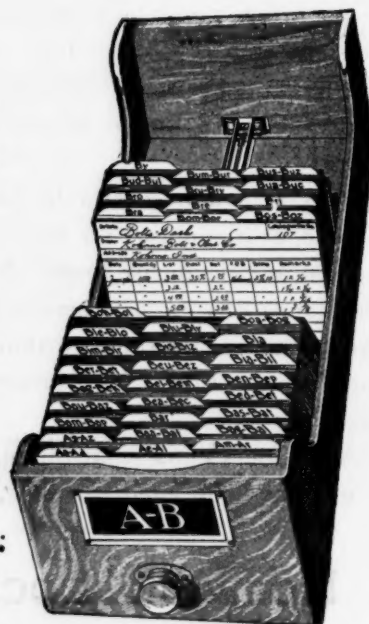
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